Environment and Economy
Partners for the Future

L'environnement et l'économie
partenaires pour l'avenir

A Conference on Sustainable Development

THE PROCEEDINGS

WINNIPEG, MANITOBA, CANADA
WINNIPEG CONVENTION CENTRE
MAY 17-19, 1989

Manitoba

ENVIRONMENT AND ECONOMY, PARTNERS FOR THE FUTURE

A Conference on Sustainable Development

The Proceedings

December, 1989

Winnipeg, Manitoba, Canada

90-04315/

ORDERING INSTRUCTIONS

Copies of the Conference Proceedings may be ordered from:

Sustainable Development Coordination Unit
Executive Council,
Province of Manitoba
305 - 155 Carlton Street
Winnipeg, Manitoba, Canada
R3C 3H8

Attention: Frank Cosway

The price of the Proceedings is $25.00, which includes the cost of reproduction, handling and postage. Cheques or money orders should be made payable to: Manitoba Research Council and mailed to the above address.

CANADIAN CATALOGUING IN PUBLICATION DATA

Main entry under title:

Environment and economy : partners for the future : a conference on sustainable development : the proceedings

Cover title
Held May 17-19, 1989, Winnipeg, Man.
Includes some text in French
ISBN 0-7711-0862-1

1. Environmental policy -- Economic aspects -- Congresses.
2. Environmental protection -- Economic aspects --
Congresses. 3. Economic development -- Environmental
aspects -- Congresses. 4. Economic policy -- Environmental
aspects -- Congresses. I. Manitoba II. Partners for the future.

HC79.E5E58 1989 363.7 C90-092650-3

printed on recycled paper

THE PREMIER OF MANITOBA

Legislative Building
Winnipeg, Manitoba, CANADA
R3C 0V8

The Government of Manitoba was both pleased and honoured to host the "Environment and Economy, Partners for the Future Conference". We were pleased in the knowledge that the conference was of such high calibre and honoured by the fact that Manitoba was able to significantly contribute to the Canadian and global momentum on the issue of sustainable development.

Sustainable development is not a radical new concept. It is rather a rational and logical extension of our society's understanding of economic development. Unfortunately, up until now our society has not done a good job of evaluating the economic consequences of failing to protect our environment. Over the last few decades we have been steadily eroding our capital base when we should have been living off our interest. The time has now arrived to chart a new course. We must re-focus our economic orientation toward living off the interest and protecting the capital. It not only makes good business sense, it guarantees that our children will have an opportunity to fulfil their economic aspirations as well.

The world community owes an incredible debt to the authors of the report of the World Commission on Environment and Development. They have painted a new and exciting vision of our future. As we prepare to enter the twenty first century, it is up to all of us to make sustainable development a central part of our agenda. Let us seize the Brundtland dream and turn the vision into reality.

I would like to take this opportunity to personally thank all those that participated in this important conference. The organizers, speakers and delegates all shared in a unique and memorable event. Thank you all.

Yours sincerely,

Gary Filmon

Gary Filmon

ACKNOWLEDGEMENTS

The "Environment and Economy, Partners for the Future" conference organizers wish to acknowledge the significant contribution made to the success of the Conference by the keynote speakers, panelists, conference and panel chairs.

The conference program contains a complete listing of Sponsors and Program Supporters. The Sponsors provided significant financial support for the conference. The Program Supporters provided travel support for many of the Conference Speakers.

The Conference Steering Committee is most appreciative of the extraordinary contribution of staff and administrative resources devoted to the implementation of the Conference by the following Manitoba Government Departments and Agencies; Executive Council, Agriculture, Energy & Mines, Environment, Industry Trade & Tourism, Natural Resources and Manitoba Research Council.

The committee acknowledges the contribution of IN-KA Meeting Planners (Winnipeg) for the provision of planning, marketing, registration and facilities co-ordination services.

The Biomass Energy Institute Inc. (Winnipeg) provided the word processing and computer services for the preparation of the conference Proceedings.

Lastly, the Conference Steering Committee wishes to acknowledge the contribution of the many volunteers, supporters and participants to the success of the conference.

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PROGRAM

Environment and Economy
Partners for the Future

L'environnement et l'économie
partenaires pour l'avenir

A Conference on Sustainable Development

providing decision-makers
in the private and public sectors
a unique forum on
the issues and opportunities
of doing business
in our changing world

WINNIPEG, MANITOBA, CANADA
WINNIPEG CONVENTION CENTRE
MAY 17-19, 1989

Manitoba

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We wish to acknowledge the sponsorship of the following companies and organizations.

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Environment and Economy
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L'environnement et l'économie
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PREMIER'S MESSAGE

The Report of the World Commission on Environment and Development heralds a new beginning in Canada and abroad. Sustainable development is an idea whose time has come.

Environmentally sound development can no longer be viewed as an option by governments and businesses. It must be a prerequisite of all future planning and decision making. Furthermore, I believe we can create economic activity and enhance our environment and resource base simultaneously. The opportunity and the challenge now for both the private and public sectors is to work jointly to implement this new agenda of change.

Manitoba is committed to making the changes necessary to implement the concept of sustainable development. I hope this conference will significantly add to our province's and Canada's efforts to respond to the Brundtland challenge.

The Honourable Gary Filmon
Premier of Manitoba

CONFERENCE LOCATIONS

All sessions will take place in either:

WCC	• Winnipeg Convention Centre, Main floor
HI	• Holiday Inn Hotel

SOCIAL EVENTS

The following social events are included in the Conference fee. Tickets for these events are in your registration kit. Please bring the ticket for entry to events.

- Gray Owl Reception, Wednesday May 17, 1730-1930
  Main floor, Winnipeg Convention Centre
- Luncheon, with address by Marc Garneau, Thursday May 18, 1200-1400
  Main floor, Winnipeg Convention Centre
- Banquet, "Welcome to My World," Thursday May 18
  Reception 1815, Dinner 1915, Entertainment 2100
  Main floor, Winnipeg Convention Centre

CONFERENCE BULLETIN

A daily bulletin, summarizing details of the previous day's presentations, will be available at the Information Desk.

Note: The conference has been designated as a non-smoking event. Please refrain from smoking at all conference sessions.

WEDNESDAY, MAY 17 AFTERNOON

> *"It is time for government and business to come together to deal with these issues."*
>
> Roy Aitken, Executive Vice-President, INCO Ltd.

CHAIR: MAURICE STRONG, Canadian Member to the World Commission on Environment and Development, and Member of Ontario Round Table on Environment and Economy (Ottawa)

1300
MR4
WCC

OFFICIAL OPENING AND WELCOME

The Honourable GARY FILMON
Premier of Manitoba

1315
MR4
WCC

KEYNOTE ADDRESS

"SUSTAINABLE DEVELOPMENT; MOVING TOWARDS CONCRETE STEPS FOR INTERNATIONAL ACTION."

The Right Honourable JOE CLARK
Secretary of State for External Affairs,
Government of Canada.

Joe Clark has been a Member of Parliament in Canada since 1972, and became Prime Minister in 1979. Since 1984 he has acted as Secretary of State for External Affairs. He is Chairman of the Cabinet Committee on Foreign and Defence policy.

1400
MR4
WCC

PANEL ***"PERSPECTIVES ON SUSTAINABLE DEVELOPMENT"***

i) "Environment and Economy; Until Death Do Part." A discussion of the opportunities and challenges in making responsible environmental behaviour compatible with robust economic development.

THOMAS D'AQUINO
President and Chief Executive Officer,
Business Council on National Issues (Ottawa)

Mr. D'Aquino has been President of the 150 member BCNI since 1981. A Member of the Canadian & International Bar Association, he has lectured on the law of international business transactions, trade, and regulation of multinational enterprise. He is Co-Chairman of the Canadian Labour Market & Productivity Centre.

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ii) "Sustainable Development; The Public's Perspective." Canadians are indicating a tremendous eagerness to resolve our planet's environmental ills. Mistrust of government and business can be real obstacles. The presentation will emphasize the need to maintain public involvement in all sustainable development activities.

COLIN ISAACS
Executive Director, Pollution Probe (Toronto)

Mr. Isaacs has degrees in chemistry. With Pollution Probe he has worked with toxic chemicals, industrial & municipal wastes, environment assessment and sustainable development.

1430 REFRESHMENT BREAK

1500
MR4
WCC

iii) "Sustainable Development; the Challenge of Social Consensus."

The challenges of sustainable development are not simply environmental or economic, but will also be challenges for individual members of Canadian Society.

DAVID JOHNSTON
Chairman, National Round Table on Environment and Economy (Montreal)

Mr. Johnston is Principal, Vice-Chancellor & Professor of Law at McGill University in Montreal. A specialist in securities, regulation, corporate & labour law, he is a member of the Board of Directors of Southam Inc. & SPAR Aerospace Ltd.

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iv) "Business and Sustainable Development—Impacts and Opportunities."
The role of business in ensuring the link between a strong economy and a healthy environment will be explored.

The Honourable TOM McMILLAN
Chairman, Focus 2000, Task Force on Environment
Canadian Chamber of Commerce (Ottawa)

A political scientist, Mr. McMillan was Minister of the Environment for Canada from 1985 to 1988. He has published a number of articles and monographs on Canadian environmental studies, human rights & Canadian heritage subjects.

1530
MR4
WCC

PANEL DISCUSSION and QUESTIONS FROM THE FLOOR

1615
to 1700
MR4
WCC

CHAIRMAN'S SUMMARY AND REMARKS

MAURICE STRONG
Canadian Member to the World Commission on Environment and Development, Member of the Ontario Round Table on Environment and Economy (Ottawa)

The former president of Montreal's Power Corp. and first chairman of Petro Canada, Mr. Strong served as executive director of the UN's environmental program in the mid-70's.

1730
to 1930
MR2
WCC

GRAY OWL RECEPTION

THURSDAY, MAY 18 MORNING

"Agreement on problem definition is crucial to a successful outcome."
Ian Smyth, President, Canadian Petroleum Association

CHAIR: ROY AITKEN, Executive Vice-President, INCO Ltd., and Member of the National Task Force on Environment and Economy (Toronto)

0900
MR1
WCC

KEYNOTE ADDRESS:
"HOW SHOULD INTERNATIONAL BUSINESS MANAGEMENT RESPOND TO THE CHALLENGE OF SUSTAINABLE DEVELOPMENT?"

Defining the environmental agenda to the year 2000 involves radical change from the past ten years. International business must be at the forefront of change into how we manage our affairs. What are the implications for companies?

The Honourable HUGH FAULKNER
Secretary General,
International Chamber of Commerce (Paris)

A top executive since 1981 of the Alcan Group in India & Switzerland, Mr. Faulkner served before that for 14 years as member of the Federal Parliament of Canada, as Minister of State for Science & Technology, as Secretary of State, and Minister of Indian Affairs and Northern Development.

1000 REFRESHMENT BREAK

1030
to 1200

CONCURRENT PANEL SESSIONS (Admission by ticket)

MR13
WCC

A.1 Policies and Processes Necessary to Achieve Sustainable Development
Chair, DONALD LEITCH, Clerk of Executive Council, Province of Manitoba

The Honourable **BRUCE STRACHAN**, British Columbia Minister of Environment, representing the Canadian Council of Ministers of Environment (CCME)

DAVID BUZZELLI, President, Dow Chemical Canada Inc. and Member of National Task Force on Environment & Economy (Hamilton)

SUSAN HOLTZ, Senior Researcher, Ecology Action Centre and Member of National Task Force on Environment & Economy (Halifax)

• •

Strathcona
HI

A.2 New Methods for Improved Decision Making
Chair, TED POYSER, Consultant/ Agrologist (Winnipeg)

FRED ROOTS, Chairman, Canadian Environmental Assessment and Research Council (CEARC), and Science Advisor, Environment Canada (Hull)

BILL HARPER, General Manager, ID Systems Ltd. (Winnipeg)

• •

MR15
WCC

A.3 New Approaches to Resource Allocation and Utilization
Chair, R. E. FORBES, Consultant, WESTARC Group Inc. (Brandon)

FRANK GAFFNEY, Project Director, Northwest Renewable Resources Center (Seattle)

GERALDINE KENNEY-WALLACE, Chairman, Science Council of Canada (Ottawa)

NIGEL RICHARDSON, Principal, N.H. Richardson Consulting (Toronto)

• •

Talbot
HI

A.4 Attitudes and Behaviours Required to Achieve Sustainable Development
Chair, ALAN SWEATMAN, General Counsel & Corporate Secretary, Hudson Bay Mining & Smelting Co. Ltd. (Winnipeg)

BEATRICE OLIVASTRI, Executive Director, National Survival Institute (Ottawa)

HUGH PHILLIPS, Executive Director, Society Environment and Energy Development Studies Foundation (SEEDS) (Edmonton)

BILL REES, Professor, School of Community & Regional Planning, University of British Columbia (Vancouver)

• •

MR12
WCC
A.5 International Centre for Sustainable Development

Chair, DAN ARCHER, Director of Sustainable Development, Manitoba Industry Trade & Tourism (Winnipeg)

See insert in registration kit for full details.

MR16
WCC
A.6 Canadian Environmental Business Opportunities

Chair, DAVE MARSHALL, Director, Pacific, Western & Northern Region, Federal Environmental Assessment and Review Office and Conference Executive Director, GLOBE '90 (Vancouver)

NEIL ANDERSON, Director, Planning and Development, Canadian Hydrographic Services, Department of Fisheries and Oceans (Ottawa)

JOHN BENNETT, Acting President, Canadian Environment Industry Association (Vancouver)

PAT LENNON, Manager of Environmental Industries Project, Industry, Science and Technology Canada (Ottawa)

Westminster
HI
A.7 Financing for Sustainable Development

Chair, TED GEORGE, General Manager, Winnipeg Business Development Corporation (Winnipeg)

TONY CASSILS, Vice President, C.F.G. Heward Investment Management Ltd. (Montreal)

JOHN GRAY, Professor, Department of Economics, University of Manitoba (Winnipeg)

KEN PIDDINGTON, Director of Environment, The World Bank, (Washington)

MR11
WCC
A.8 Achieving Sustainable Regional Economic Development

Her Worship **SYLVIA SUTHERLAND**, Mayor of Peterborough and Member of the Ontario Round Table (Peterborough)

MICHAEL DECTER, Partner, Peat Marwick Consulting Group Ltd. (Winnipeg)

ROBERT PRESCOTT-ALLEN, Partner, PADATA (Victoria)

DENNIS WALLACE, Assistant Deputy Minister, Western Economic Diversification Office (Winnipeg)

1200
MR5
WCC
LUNCHEON
"A PLANETARY PERSPECTIVE ON SUSTAINABLE DEVELOPMENT."

Canada's space program will play an important role in measuring and monitoring the state of the Earth's environment and the development of its natural resources.

MARC GARNEAU
Canadian Astronaut, Deputy Program Manager, Canadian Astronaut Program (Ottawa)

Mr. Garneau is one of the six Canadian astronauts selected in December, 1983, and was seconded to NRCC by DND in February, 1984, to begin astronaut training. He flew as a payload specialist on Space Shuttle Challenger during Mission 41-G (STS-17) October 5-13, 1984.

THURSDAY, MAY 18 AFTERNOON

> *"Canada has the opportunity to serve as a role model for global integration of development policy."*
> Lloyd McGinnis, former Chairman of the Board
> Canadian Chamber of Commerce

1400
MR1
WCC
PANEL PRESENTATION **"GLOBAL STEWARDSHIP"**

i) "Environmental conservation in Brazil Today." The presentation will address "The Brazilian reality and the possibilities of sustainable development" and "The Atlantic Forest region, considered the most endangered eco-system in the country, and the current measures underway to protect it."

JOSE PEDRO de OLIVEIRA COSTA
Professor of Environmental Planning, University of Sao Paulo (Brazil)

Mr. Costa is a member of the Advisory Committee of IVCM and WWF for Brazil, organized the Latin American meeting of the Bruntland Commission, co-ordinator for declaration of preservation of the Atlantic Forest remaining in Sao Paulo, and is a regional counsellor of the International Union for the Conservation of Nature.

ii) "Whose Stewardship? A View from the South." The division of responsibility for Global Environment is a central political issue. There are significant differences between the developed countries and those of the South.

KEN PIDDINGTON
Director of Environment, The World Bank (Washington)

Mr. Piddington became New Zealand's Commissioner for the Environment in 1976, subsequently Director-General of Conservation. He is active in the international setting on issues such as Antarctic, marine protection and environmental impact assessments.

iii) "Developing a Sustainable World." An outline of ideas from CIDA on how development assistance can contribute to sustainable development.

DOUGLAS LINDORES
Vice-President, Canadian International Development Agency (Hull)

1530 to 1700	CONCURRENT PANEL SESSIONS (Admission by ticket)	
MR15 WCC	**B.1 Management Systems and Skills for Achieving Sustainable Development** Chair, CRAWFORD JENKINS, Director, Prairie Farm Initiative, North American Wildlife Foundation (Winnipeg)	**PETER LEBLANC**, Executive Secretary, Committee of Regional Executives, Environment Canada (Dartmouth) **BARRY SADLER**, Director, Institute of the North American West (Victoria) **SUSIE WASHINGTON**, Principal, Western Environment and Social Trends (WEST) (Calgary)
Talbot HI	**B.2 Monitoring Advances in Sustainable Development** Chair, BRIAN KELLY, Manager Consulting Services, Deloitte Haskins & Sells (Winnipeg)	**MICHAEL KEATING**, Environment Writer and Consultant (Toronto) **DOUG MILLER**, President, Synergistics Consulting Ltd. and The Environmental Monitor (Toronto)
MR13 WCC	**B.3 Environmental Regulation and Economic Incentives** Chair, RAY BROUZES, Director of Environmental Affairs, ALCAN Aluminium Co. Ltd. (Montreal)	**ROY AITKEN**, Vice-President, INCO and Member of the National Round Table on Environment and Economy (Toronto) **BOB PAGE**, Chairman, Canadian Environmental Advisory Council (Hull) **PETER PEARSE**, Professor, Faculty of Forestry, University of British Columbia (Vancouver)
MR11 WCC	**B.4 Public Participation** Chair, S. GLENN SIGURDSON, Partner, Taylor McCaffrey Chapman (Winnipeg)	**JACK DUBOIS**, Provincial Coordinator, Manitoba Eco-Network and Member of Manitoba Round Table on Environment & Economy (Winnipeg) **RICK COOKE**, Chief Executive Officer, Manitoba Hazardous Waste Management Corporation (Winnipeg) **CHARLES FERGUSON**, Director, Environmental Affairs, INCO (Toronto) **LESLIE WHITBY**, Director, Sustainable Development Branch, Canadian Wildlife Service, Environment Canada (Ottawa)
MR12 WCC	**B.5 International Centre for Sustainable Development** Chair, DAN ARCHER, Director, Sustainable Development, Manitoba Industry Trade & Tourism (Winnipeg)	See insert in registration kit for full details.
MR16 WCC	**B.6 Land, Water and Energy Sectors** Chair, LEN SIEMENS, Associate Dean, Faculty of Agriculture, University of Manitoba (Winnipeg)	**W. T. HANCOX**, Vice-President, Waste Management, Atomic Energy Canada Ltd. (Pinawa) **PETER LARKIN**, Chairman, Sustainable Fisheries Network and President, Rawson Academy (Vancouver) **VACLAV SMIL**, Professor, Department of Geography, University of Manitoba (Winnipeg)
Westminister HI	**B.7 Manufacturing and Retail Sectors** Chair, MICHAEL HILL, Senior Consultant, Peat Marwick and Past President, Winnipeg Chamber of Commerce (Winnipeg)	**JOHN DILLON**, Manager Environmental Affairs, Canadian Manufacturers Association (Ottawa) **MARY GRANSKOU**, Fund Raising Director, Friends of the Earth (Ottawa) **DAVID SIMPSON**, Executive Director, Consumers Association of Canada (Ottawa)
Strathcona HI	**B.8 Agriculture Sector** Chair, HARRY SIEMENS, Communication Specialist, Manitoba Natural Resources (Winnipeg)	**GREG ARASON**, Chief Executive Officer, Manitoba Pool Elevators (Winnipeg) **C. F. BENTLEY**, Professor Emeritus Agriculture, University of Alberta (Edmonton) **BOB MCNABB**, Past President, Manitoba & North Dakota Zero-Tillage Farmers Association (Minnedosa)

1815 to 2200 WCC BANQUET "Welcome to My World"
Performers representing various countries will take us on a journey around the world, where we will view man's relationship with the environment as depicted through traditional dance and song.

Entertainment by Folk Arts Council of Winnipeg Inc.

FRIDAY, MAY 19 MORNING

> *"There is tremendous potential for a new kind of decision making."*
>
> Adam H. Zimmerman, Chairman, Noranda Forest Inc.

Chair: The Honourable GLEN CUMMINGS, Deputy Premier, Manitoba Minister of Environment and Chairman of Sustainable Development Committee of Cabinet for Manitoba.

0900
MR5
WCC

KEYNOTE ADDRESS
"LOOKING TOWARDS THE FUTURE."

DR. EMIL SALIM

Indonesia Minister of Population and Environment, and former Member of the World Commission on Environment and Development (Indonesia)

Mr. Salim is Professor of Economics, University of Indonesia, and lecturer at the Army Command Staff School in Bandung. He held the position of President of the Governing Council of UNEP from 1984-87. In 1972 Mr. Salim became his country's leading spokesperson for the environment when he was appointed Chairman of the Committee on Formulation & Working System of Environmental Development, a position he still holds.

1000 REFRESHMENT BREAK

1030
MR5
WCC

PANEL PRESENTATION
"ACTION PLANS FOR THE FUTURE."

"Sustainable Development: A New 'Quiet Revolution'"

Perception and attitudes have finally changed between people of the diverse economic and environmental sectors. A new consensus emerges to the effect that there is no possible economic development without a real preservation of our environment.

Sustainable development *is possible*. Quebec is facing this challenge with optimism and has resolutely taken the first necessary steps toward it: dialogue is engaged and our concerted actions will benefit us all.

The Honourable GUY RIVARD
Minister for Technology, Province of Quebec

In 1982-84, Mr. Rivard was Assistant Deputy Minister for Health Services at the Ministry of Social Affairs in Quebec, and representative of the Quebec government at the World Health Organization. He is currently a member of the Parliamentary Commission on Economics and Labour.

• •

"Protecting the Ozone Layer."
An industry perspective on key issues around Chlorofluorocarbons (CFS's) and industry/government cooperation in finding a solution to a global environmental problem.

BILL BARLEY
General Manager of Fluorocarbon Products,
DuPont Canada (Mississauga)

Mr. Barley has been with DuPont since 1956, where he has held a number of accounting and financial positions in manufacturing, businesses, and at the corporate level.

• •

"Global Opportunities for Business and the Environment."
Through GLOBE '90, Canadians will offer to the world a unique gathering of scientific, technological, manufacturing and planning skills necessary for implementing an integrated approach to sustainable development.

IAN SMYTH
President, Canadian Petroleum Association, representing Global Opportunities for Business and Environment (GLOBE '90) (Calgary)

Mr. Smyth has extensive experience as a foreign service officer with the Federal Government in Australia, Zimbabwe, Zambia, Kenya and Great Britain, later as Assistant Secretary of the Treasury Board. He has also served as sessional lecturer at Universities and management schools in Canada and abroad. He joined the CPA as President in 1978.

1130
MR5
WCC

CLOSING ADDRESS
"THE URGENT NEED FOR ACTION NOW...SUSTAINABLE DEVELOPMENT IN THE PRIVATE AND PUBLIC SECTORS."

The Honourable GARY FILMON
Premier of Manitoba

A registered professional engineer, Mr. Filmon is a former Manitoba cabinet minister and City of Winnipeg councillor. As a government member in the Manitoba Legislature he has acted as Legislative Assistant to the Minister of Finance and Energy & Mines, then was named Minister of Consumer & Corporate Affairs and Environment, and assumed responsibility for the Manitoba Housing & Renewal Corporation. As Premier since 1988, he has made environment a government priority.

1200 CONFERENCE CLOSE

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External Affairs Canada
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INCO Ltd.
Industry, Science and Technology Canada
Manitoba Aerospace Technology Program
National Round Table on Environment and Economy
Quebec Ministry of Industry, Commerce & Technology
Science Council of Canada
Society, Environment and Energy Development Studies Foundation (SEEDS)
The Pollution Probe Foundation
Wardrop Engineering Inc.

Conference Information

For information about the conference at a later date, please contact:

Frank Cosway
Manitoba Department of Environment
Planning Department
#960-330 St. Mary Avenue
Winnipeg, Manitoba R3C 3Z5
Tel. (204) 945-8747

"Let's treat Canada as if we plan to stay."
Susan Holtz, Ecology Action Centre

Environment and Economy
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partenaires pour l'avenir

PROGRAMME

Environment and Economy
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L'environnement et l'économie
partenaires pour l'avenir

Une conférence sur le développement durable

à l'intention des décideurs des secteurs privé et public:

forum unique sur les questions et les possibilités

liées au monde des affaires

dans un milieu en évolution

WINNIPEG (MANITOBA) CANADA
CENTRE DES CONGRÈS DE WINNIPEG
DE MIDI, LE 17 MAI À MIDI, LE 19 MAI 1989

Manitoba

PROMOTEURS

Nous tenons à remercier les sociétés et organisations suivantes:

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Wardrop Engineering Inc.

LE MESSAGE DU PREMIER MINISTRE

Le rapport de la commission mondiale sur l'environnement et le développement annonce le début au Canada et ailleurs du développement durable, concept opportun à l'heure actuelle.

En effet, on ne peut plus laisser les entreprises et les pouvoirs publics libres de choisir ou non des mesures de développement salubres. Il faudra dorénavant tenir compte de l'environnement avant de dresser des plans et de prendre des décisions. Je crois en outre qu'il est possible de créer une activité économique tout en améliorant notre environnement et en mettant en valeur nos ressources. Il incombe maintenant aux secteurs privé et public de relever le défi et de travailler conjointement en vue de mettre en pratique les changements qui s'imposent.

Le Manitoba s'engage à apporter les changements nécessaires pour appliquer le principe du développement durable. J'ose espérer que cette conférence aidera notre province et le Canada à relever le défi lancé par la Commission Brundtland.

L'honorable Gary Filmon
Premier ministre du Manitoba

LIEUX DES CONFERENCES

Toutes les séances auront lieu soit:

au WCC	• Centre des Congrès de Winnipeg, étage principal, soit
à l'HI	• Hôtel Holiday Inn

AUTRES ACTIVITES

Le droit d'entrée à la conférence donne également droit aux activités ci-dessous. Les billets sont inclus dans l'enveloppe d'inscription. Prière de se munir du billet pour entrer.

- Réception Gray Owl, le mercredi 17 mai, 17h30-19h30
  Etage principal, Centre des congrès de Winnipeg
- Déjeuner, avec discours de Marc Garneau, le jeudi 18 mai, midi-14h
  Etage principal, Centre des congrès de Winnipeg
- Banquet "Bienvenue à mon monde," le jeudi 18 mai
  Réception 18h15. Dîner 19h15. Spectacles 21h.
  Etage principal, Centre des congrès de Winnipeg.

BULLETIN DE LA CONFERENCE

Un bulletin quotidien qui résume les discours de la veille sera à la disposition des intéressés au comptoir d'information.

Avis: Il a été décidé qu'il serait interdit de fumer à la conférence. Prière de s'abstenir à toutes les séances.

MERCREDI, LE 17 MAI. APRÈS-MIDI

> *"Il est grand temps que le gouvernement et les industriels s'unissent pour régler ces questions."*
>
> Roy Aitken, Vice-président-administrateur INCO Ltd.

PRÉSIDENT : MAURICE STRONG, membre canadien de la commission mondiale de l'environnement et du développement et membre de la table ronde de l'Ontario sur l'environnement et l'économie (Ottawa)

13h **MR4** **WCC**	OUVERTURE OFFICIELLE ET ACCUEIL	L'honorable GARY FILMON Premier ministre du Manitoba
13h15 **MR4** **WCC**	ALLOCUTION PRINCIPALE **"DÉVELOPPEMENT DURABLE; MESURES CONCRÈTES PROCHAINES EN VUE D'UNE ACTION INTERNATIONALE."**	 Le très honorable JOE CLARK Secrétaire d'état aux affaires extérieures, Gouvernement du Canada Joe Clark est membre du parlement canadien depuis 1972 et est devenu Premier ministre en 1979. Depuis 1984 il est chargé du Secrétariat d'état aux affaires extérieures. Il est président du comité du cabinet sur la politique étrangère et de défense.
14h **MR4** **WCC**	PANEL ***"PERSPECTIVES DE DÉVELOPPEMENT DURABLE"***	
	i) "L'environnement et l'économie; unis jusqu'à la mort." Discussion sur les occasions et les défis qui se présentent lorsqu'on veut rendre le comportement environnemental compatible avec un vigoureux développement économique.	THOMAS D'AQUINO Président et administrateur principal Conseil des hommes d'affaires sur les questions nationales (Ottawa) M. D'Aquino est président du BCNIN qui compte 150 membres, depuis 1981. Membre de l'Association du barreau canadien et international, il a donné des conférences sur le droit en matière de transactions d'affaires internationales, de commerce et de réglementation des entreprises multinationales. Il est co-président du Centre canadien de marché du travail et de la productivité.
	ii) "Développement durable; la perspective du public." Les Canadiens manifestent fortement leur désir de guérir les maux environnementaux qui affligent notre planète. La méfiance que leur inspirent le gouvernement et le monde des affaires risque d'être un sérieux obstacle. Dans son allocution, l'orateur insistera sur le fait qu'il faut continuer à faire participer les citoyens à toutes les activités de développement durable.	COLIN ISAACS Directeur-administrateur, Enquêtes pollution (Toronto) M. Isaacs est diplômé en chimie. Au sein d'Enquêtes Pollution, il a travaillé sur les substances chimiques toxiques, les déchets industriels et municipaux, à l'évaluation de l'environnement et au développement durable.
14h30	PAUSE-RAFRAÎCHISSEMENTS	
15h **MR4** **WCC**	***iii) "Développement durable; le défi posé par l'accord de la société."*** Les défis que pose le développement durable ne sont pas simplement d'ordre environnemental ou économique mais devront être relevés par les membres individuels de la société canadienne.	DAVID JOHNSTON Président, table ronde nationale sur l'environnement et l'économie (Montréal). M. Johnston est principal, vice-chancelier et professeur de droit à l'université McGill de Montréal. Spécialiste des questions de valeurs sûres, réglement, droit des sociétés et du travail, il est membre du conseil d'administration de Southam Inc. & Spar Aerospace Ltd.
	iv) "L'industrie et le développement durable-effets et possibilités." Le rôle que doivent jouer les entreprises pour concilier une forte économie et un environnement sain sera examiné.	L'honorable TOM McMILLAN Président, Focus 2000, groupe de travail sur l'environnement, Chambre de commerce canadienne (Ottawa) Spécialiste des sciences politiques, M. McMillan a été ministre de l'Environnement, Canada de 1985 à 1988. Il a publié de nombreux articles et monographes sur les études environnementales canadiennes, les droits de l'homme et le patrimoine canadien.
15h30 **MR4** **WCC**	DISCUSSION DU PANEL ET QUESTIONS DE L'AUDITOIRE	

16h15
à 17h
MR4
WCC

RESUME ET REMARQUES DU PRESIDENT

MAURICE STRONG
Membre canadien de la Commission mondiale sur l'environnement et le développement, membre de la table ronde ontarienne sur l'environnement et l'économie (Ottawa)

Ex-président de la Power Corp. de Montréal et premier président de Petro Canada, M. Strong a été le directeur-administrateur du programme environnemental des NU au milieu des années 70.

17h30
à 19h30
MR2
WCC

RECEPTION GRAY OWL

JEUDI MATIN, LE 18 MAI

> *"Il est essentiel pour réussir de se mettre d'accord sur la définition des problèmes."*
>
> Ian Smyth, président, Canadian Petroleum Association

PRESIDENT: ROY AITKEN, vice-président-administrateur INCO Ltd., et membre du groupe de travail sur l'environnement et l'économie (Toronto)

9h
MR1
WCC

ALLOCUTION PRINCIPALE

"COMMENT LES GESTIONNAIRES DES ENTREPRISES INTERNATIONALES DEVRAIENT ILS RÉAGIR POUR RELEVER LE DEFI POSÉ PAR LE DEVELOPPEMENT DURABLE?"

Pour déterminer le travail à accomplir en faveur de l'environnement d'ici l'an 2000, il faudra abandonner définitivement les habitudes acquises au cours des dix derniers années. Les entreprises internationales doivent se trouver à l'avant-garde du changement dans la manière de mener nos affaires. Quelles en seront les conséquences pour les sociétés?

L'honorable HUGH FAULKNER
Secrétaire général
Chambre de commerce international (Paris)

L'un des administrateurs en chef de l'Alcan Group en Inde et en Suisse depuis 1981, M. Faulkner a été auparavant député fédéral, ministre d'Etat pour la science et technologie, secrétaire d'Etat et ministre des affaires indiennes et du nord canadien.

10h RAFRAÎCHISSEMENTS

10h30
à midi

SÉANCES DE PANEL SIMULTANÉES (admission sur présentation du billet)

MR13
WCC

A.1 Programmes et mesures nécessaires pour parvenir à un développement durable
Président: DONALD LEITCH, greffier du Conseil exécutif province du Manitoba

L'honorable **BRUCE STRACHAN**, ministre de l'environnement de Colombie-Britannique représentant le Conseil canadien des ministres de l'environnement CCME)

DAVID BUZZELLI, président, Dow Chemical Canada Inc. et membre du groupe national de travail sur l'environnement et l'économie (Hamilton)

SUSAN HOLTZ, recherchiste principale, Ecology Action Centre et membre du groupe national de travail sur l'environnement et l'économie (Halifax)

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Strathcona
HI

A.2 Nouvelles méthodes pour prendre de meilleures décisions
Président: TED POYSER, expert/agrologue (Winnipeg)

FRED ROOTS, président, Conseil canadien de l'évaluation et de la recherche sur l'environnement (CCERE), et conseiller scientifique, environnement Canada (Hull)

BILL HARPER, gérant général, ID Systems Ltd. (Winnipeg)

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MR15
WCC

A.3 Nouveaux moyens d'allouer et d'utiliser les ressources
Président: R. E. FORBES, expert-conseil, WESTARC Group Inc. (Brandon)

FRANK GAFFNEY, directeur de projet, Northwest Renewable Resources Center (Seattle)

GERALDINE KENNEY-WALLACE, présidente, Conseil des sciences du Canada (Ottawa)

NIGEL RICHARDSON, principal, N.H. Richardson Consulting (Toronto)

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Talbot
HI

A.4 Attitudes et comportements requis pour parvenir à un developpement durable
Président: ALAN SWEATMAN, conseiller général et secrétaire de société, Hudson Bay Mining & Smelting Co. Ltd. (Winnipeg)

BEATRICE OLIVASTRI, directrice-administratrice, Institut national de survie (Ottawa)

HUGH PHILLIPS, directeur-administrateur, Society Environment and Energy Development Studies Foundation (SEEDS) (Edmonton)

BILL REES, professeur, École de planification régionale et communautaire, Université de Colombie-Britannique (Vancouver)

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MR12
WCC
A.5 Centre international de développement durable

Président: DAN ARCHER, directeur de développement durable, Industrie, Commerce et Tourisme du Manitoba (Winnipeg)

Se reporter à la feuille dans l'enveloppe d'inscription pour plus amples détails.

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MR16
WCC
A.6 Occasions de faire des affaires au Canada relativement à l'environnement

Président, DAVE MARSHALL, directeur, région du Pacifique, de l'ouest et du nord, Bureau fédéral de l'évaluation et de l'examen de l'environnement, et directeur administrateur de la conférence, GLOBE '90 (Vancouver)

NEIL ANDERSON, directeur, planification et développement, Services hydrographiques canadiens, ministère des pêches et océans (Ottawa)

JOHN BENNETT, président suppléant, Association canadienne de l'industrie de l'environnement (Vancouver)

PAT LENNON, gérant du projet des industries de l'environnement, Industrie, science et technologie Canada (Ottawa)

• •

Westminster
WCC
A.7 Financement du developpement durable

Président: TED GEORGE, gérant général, Winnipeg Business Development Corporation (Winnipeg)

TONY CASSILS, vice-président, C.F.G. Heward Investment Management Ltd. (Montréal)

JOHN GRAY, professeur, département de science économique, université du Manitoba (Winnipeg)

KEN PIDDINGTON, directeur de l'environnement, la Banque mondiale (Washington)

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MR11
WCC
A.8 Réalisation d'un développement économique régional durable

Son honneur, **SYLVIA SUTHERLAND**, maire de Peterborough et membre de la table ronde de l'Ontario (Peterborough)

MICHAEL DECTER, associé, Peat Marwick Consulting Group Ltd. (Winnipeg)

ROBERT PRESCOTT-ALLEN, associé, PADATA (Victoria)

DENNIS WALLACE, sous-ministre adjoint, Western Economic Diversification Office (Winnipeg)

12h00
MR5
WCC
DEJEUNER
"PERSPECTIVE PLANÉNAIRE DU DÉVELOPPEMENT DURABLE."

Le programme spatial du Canada jouera un rôle important qui permettra de mesurer et de surveiller l'état de l'environnement de la Terre ainsi que le développement de ses ressources naturelles.

MARC GARNEAU
astronaute canadien, gestionnaire-adjoint du programme, programme des astronautes canadiens (Ottawa)

M. Garneau est l'un des six astronautes canadiens choisis en décembre 1983. Il a été soutenu à la NRCC par le ministère de la défense nationale en février 1984 pour commencer l'entraînement des astronautes. A bord de la navette spatiale Challenger il a pris part, à titre de spécialiste des Etats de solde à la mission 41-G(STS-17), du 5 au 13 octobre 1984.

JEUDI 18 MAI, APRÈS-MIDI

> *"Le Canada a la possibilité de servir de modèle pour l'intégration globale d'une politique de développement."*
> Lloyd McGinnis, ex-président de la Commission, Chambre de commerce canadienne.

14h
MR1
WCC
ALLOCUTION DES MEMBRES DU PANEL **"DIRECTION GLOBALE"**

i) "La préservation de l'environnement au Brésil à l'heure actuelle." "La réalité brésilienne et les possibilités de développement durable" et "la région des forêts de l'Atlantique, considérée comme l'éco-système le plus en péril du pays, et les mesures actuellement adoptées pour la protéger."

JOSE PEDRO de OLIVEIRA COSTA
Professeur de planification environnementale université de Sao Paulo (Brésil).

M. Costa est membre du comité consultatif de l'IVCM et de la WWF pour le Brésil, et est conseiller régional de l'Union internationale pour la préservation de la nature.

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ii) "L'orientation donnée par qui? Un point de vue du sud." La division des responsabilités pour l'environnement global est une question politique majeure. Il existe des différences considéables entre les pays développés et ceux du sud.

KEN PIDDINGTON
Directeur de l'environnement, la banque mondiale (Washington)

M. Piddington est devenu le commissaire de l'environnement en Nouvelle-Zélande en 1976, puis directeur général de la préservation. Il joue un grand rôle dans l'arène internationale dans des questions telles que l'Antarctique, la protection marine et les évaluations des impacts sur l'environnement.

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iii) "Le développement d'un monde durable." Les idées de la CIDA sur la façon dont l'aide au développement peut contribuer à un développement durable.

DOUGLAS LINDORES
Vice-président, Agence canadienne de développement international (Hull)

15h30
à 17h SÉANCES DE PANEL SIMULTANÉES (admission sur présentation d'un billet)

MR15 WCC	**B.1 Systèmes et connaissances de gestion pour parvenir à un développement durable** Président: CRAWFORD JENKINS, directeur, Prairie Farm Initiative, North American Wildlife Foundation (Winnipeg)	**PETER LEBLANC**, secrétaire exécutif, comité des directions régionales, Emploi Canada (Dartmouth) **BARRY SADLER**, directeur, Institute of the North American West (Victoria) **SUSIE WASHINGTON**, principal, Western Environment and Social Trends (WEST) (Calgary)
Talbot HI	**B.2 Surveillance des progrès dans le développement durable** Président: BRIAN KELLY, gestionnaire, services de consultation, Deloitte, Haskin & Sells (Winnipeg)	**MICHAEL KEATING**, écrivain sur l'environnement et expert (Toronto) **DOUG MILLER**, président, Synergistics Consulting Ltd. et The Environmental Monitor (Toronto)
MR13 WCC	**B.3 Réglementation de l'environnement et incitatifs économiques** Président: RAY BROUZES, directeur des affaires environnementales, ALCAN Aluminium Co. Ltd. (Montreal)	**ROY AITKEN**, vice-président INCO et membre de la table ronde nationale sur l'environnement et l'économie (Toronto) **BOB PAGE**, président, conseil consultatif environnemental canadien (Hull) **PETER PEARSE**, professeur, école des forêts, université de Colombie-Britannique (Vancouver)
MR11 WCC	**B.4 Participation du public** Président: S. GLENN SIGURDSON, associé, Taylor McCaffrey Chapman (Winnipeg)	**JACK DUBOIS**, coordonnateur provincial, Manitoba Eco-Network et membre de la table ronde du Manitoba sur l'environnement et l'économie (Winnipeg) **RICK COOKE**, administrateur en chef, Société manitobaine de gestion des produits dangereux (Winnipeg) **CHARLES FERGUSON**, directeur, affaires environnementales, INCO (Toronto) **LESLIE WHITBY**, directeur, direction du développement durable, service de la faune canadienne, environnement Canada (Ottawa)
MR12 WCC	**B.5 Centre international de développement durable** Président: DAN ARCHER, directeur, développement durable, industrie, commerce et tourisme du Manitoba (Winnipeg)	Se reporter à l'enveloppe de documentation pour de plus amples détails.
MR16 WCC	**B.6 Secteurs du sol, de l'eau et de l'énergie** Président: LEN SIEMENS, doyen adjoint, faculté d'agriculture, université du Manitoba (Winnipeg)	**W. T. HANCOX**, vice-président, gestion des déchets, énergie atomique du Canada ltée (Pinawa) **PETER LARKIN**, président, Sustainable Fisheries Network et président, Rawson Academy (Vancouver) **VACLAV SMIL**, professeur, département de géographie, université du Manitoba (Winnipeg)
Westminster HI	**B.7 Secteurs de la fabrication et de la vente au détail** Président: MICHAEL HILL, expert-conseil principal, Peat Marwick et ex-président de la Chambre de commerce (Winnipeg)	**JOHN DILLON**, gestionnaire, affaires environnementales, association canadienne de manufacturiers (Ottawa) **MARY GRANSKOU**, directrice de la mobilisation des fonds, Amis de la terre (Ottawa) **DAVID SIMPSON**, directeur-administrateur, association des consommateurs du Canada (Ottawa)
Strathcona HI	**B.8 Secteur Agricole** Président: HARRY SIEMENS, spécialiste en communications, ressources naturelles du Manitoba (Winnipeg)	**GREG ARASON**, administrateur en chef, Manitoba Pool Elevators (Winnipeg) **C. F. BENTLEY**, professeur émeritus d'agriculture, université de l'Alberta (Edmonton) **BOB MCNABB**, ex-président, Manitoba & North Dakota Zero-Tillage Farmers Association (Minnedosa)

18h15
à 22h
WCC

BANQUET "Bienvenue à mon monde"
Des artistes représentant divers pays nous feront faire un voyage autour du monde, où nous verrons la relation entre l'homme et l'environnement, décrite au moyen de danses et de chansons traditionnelles.

Spectacle donné par le Folk Arts Council of Winnipeg Inc.

VENDREDI MATIN, LE 19 MAI

"Il existe un énorme potentiel pour un nouveau genre de prise de décisions."
Adam H. Zimmerman, président, Noranda Forest Inc.

Président: L'Honorable GLEN CUMMINGS, premier ministre adjoint, Ministre de l'environnement du Manitoba et Président du comité du cabinet sur le développement durable pour le Manitoba.

09h
MR5
WCC

ALLOCUTION PRINCIPALE
"TOURNONS-NOUS VERS L'AVENIR."

DR. EMIL SALIM
Ministre de la population et de l'environnement de l'Indonésie et ancien membre de la Commission Mondiale sur l'environnement et le développement (Indonésie).

M. Salim est professeur d'économie à l'Université de l'Indonésie, et assistant à l'Army Command Staff School de Bandung. Il était Président du Conseil dirigeant de UNEP de 1984 à 1987. En 1972 M. Salim est devenu le porte-parole principal de son pays sur l'environnement lorsqu'il est devenu le Président du Committee on Formulation & Working System of Environmental Development, position qu'il tient encore.

10h PAUSE – RAFRAÎCHISSEMENTS

10h30
MR5
WCC

PANEL
"PLANS D'ACTION POUR L'AVENIR."

"Le développement durable: une nouvelle revolution 'tranquille'"

Les divers secteurs de l'économie et de l'environnement ont finalement changé de perception et d'attitude. On finit maintenant par se rendre compte qu'il ne sera plus possible de développer l'économie sans vraiment préserver l'environnement.

Mais le développement durable *est possible*. Le Québec relève ce défi avec optimisme et a résolument pris les premières mesures nécessaires pour y parvenir: le dialogue a été engagé et en agissant de concert on assurera le bien commun.

L'Honorable GUY RIVARD
Ministre de la technologie, Province de Québec

De 1982-84, M. Rivard était sous-ministre adjoint des Services de la santé au ministère des affaires sociales du Québec, et représentant du Gouvernement du Québec à l'OMS. Il est, actuellement, membre de la Commission parlementaire sur l'économie et le travail.

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"La protection de la couche ozone."
Une perspective du secteur industrie sur les grandes questions des chlorofluorocarbones (CFS) et la coopération industrie/gouvernement dans la recherche d'une solution au problème de l'environment global.

BILL BARLEY
Directeur général de Fluorocarbon Products,
Dupont Canada (Mississauga)

M. Barley est chez Dupont depuis 1956 où il a servi dans de nombreuses positions de comptabilité et de finances en fabrication, en commerce et au niveau de direction.

• •

"Possibilités globales pour le commerce et l'environnement."
Avec GLOBE '90, les canadiens offriront au monde une réunion unique d'expertise scientifique, technologique, de fabrication et de planification essentielles à la mise en vigueur une approche intégrée au développement durable.

IAN SMYTH
Président de l'Association canadienne pétrolière, représentant Global Opportunities for Business and Environment (GLOBE '90) (Calgary)

M. Smyth est chevronné du service diplomatique du Gouvernement fédéral en Australie, au Zimbabwe, en Zambie, au Kenya et en Grande-Bretagne et plus tard, comme Secrétaire adjoint du Conseil du trésor. Il a aussi été conférencier de trimestre aux universités et aux collèges d'administration au Canada et à l'étanger. Il est entré comme président de l'ACP en 1978

11h30
MR5
WCC

ALLOCUTION DE CLÔTURE
"LE BESOIN URGENT D'ACTION IMMEDIATE...LE DÉVELOPPEMENT DURABLE DANS LES SECTEURS PRIVÉ ET PUBLIC."

L'Honorable GARY FILMON
Premier ministre du Manitoba

M. Filmon, ingénieur professionnel est ancien ministre du Cabinet du Gouvernement du Manitoba et conseiller de la ville de Winnipeg. En tant que membre du gouvernement à la législature du Manitoba, il a servi d'adjoint législatif au Ministre des finances, de l'énergie et des mines, puis il a été nommé Ministre des affaires des consommateurs, des corporations et de l'environnement et a été responsable de la Corporation manitobaine du logement et du renouvellement. En tant que Premier ministre depuis 1988, il a fait de l'environnement une des priorités de son gouvernement.

12h CLÔTURE DE LA CONFÉRENCE

PROMOTEURS DU PROGRAMME

Nous remercions les organisations suivantes de l'appui qu'elles ont apporté au programme:

Principaux promoteurs

Chambre de commerce canadienne, groupe de travail sur l'environnement
Conseil consultatif de l'environnement canadien
Conseil canadien d'évaluation et de recherche sur l'environnement
Agence canadienne de développement international

Promoteurs

Colombie-Britannique, ministère de l'environnement
Conseil des hommes d'affaires sur les questions nationales
Association canadienne environnement industrie
Association canadienne des manufacturiers
Canadian Petroleum Association
Ville de Peterborough
Dow Chemical Canada Inc.
DuPont Canada
Environnement Canada, région atlantique
Environnement Canada, Direction du développement durable
Division de l'environnement, la banque mondiale
Environmental Monitor
Affaires extérieures Canada
Pêches et océans Canada
Hudson Bay Mining & Smelting Co. Ltd.
INCO Ltd.
Industrie, science et technologie, Canada
Programme de technologie aérospatiale du Manitoba
Table ronde nationale sur l'environnement et l'économie
Ministère de l'industrie, du commerce et de la technologie du Québec
Conseil des sciences du Canada
Fondation d'études de développement de la société, de l'environnement et de l'énergie (SEEDS)
La fondation enquêtes pollution
Wardrop Engineering Inc.

Information sur la conference

Pour plus amples informations sur la conférence à une date postérieure, communiquer avec:

Frank Cosway
Ministère de l'environnement du Manitoba
Services de planification
#960-330 avenue Ste-Marie
Winnipeg (Manitoba) R3C 3Z5
Tel: (204) 945-8747

"Traitons le Canada comme si nous avions l'intention d'y rester."
Susan Holtz, Centre d'action écologique

Environment and Economy
Partners for the Future

L'environnement et l'économie
partenaires pour l'avenir

OPENING STATEMENTS

The Honourable Gary Filmon

Premier of Manitoba
Room 204 Legislative Buildings
Winnipeg, Manitoba R3C 0V8

Good afternoon ladies and gentlemen, and welcome to our conference on "Environment and Economy - Partners for the Future".

I would particularly like to extend a special welcome to those speakers and delegates from outside Manitoba and Canada. I hope your stay in Winnipeg is both enjoyable and productive.

As Manitobans, we are particularly proud of our Province and we hope that you will have an opportunity to take in some of our many sites and attractions during your visit. We are proud of our parks and green space and we have just begun, this week, an exhibit of Pandas. You might also wish a little shopping expedition. If we can be of any service to you, please don't hesitate to speak to Frank Cosway, our Conference Coordinator, or any other Steering Committee Member.

On behalf of the Manitoba Government, it gives me a great deal of pleasure to officially open this conference. We are looking forward to three days of stimulating presentations, debates and information exchange on the issue of Sustainable Development.

The World Commission on Environment and Development has thrown out an incredible challenge to the world to restructure its economic development.

It is very rare, when one document can ignite such world-wide interest and become a powerful focal point to change. We are particularly fortunate to have some of the visionary leaders behind the Brundtland Commission like Maurice Strong and Dr. Emil Salim with us for our conference.

Sustainable Development has quickly emerged in Canada as a central theme of governments, industry and environmental organizations. It is our government's hope that this national conference will serve as yet another important catalyst to spark the much needed change in our approach to development and further our understanding of this highly complex, yet fundamental issue.

People from coast to coast in Canada are now asking the critical question ... "What is Sustainable Development?" The question is being asked in corporate board-rooms, in union halls, municipal offices, in city halls and in cabinet room chambers.

While the answer in some peoples' minds is still somewhat vague and conceptual, it is no less real or important. What is critical is that we are now asking the question and, more importantly, what we are doing is building a common definition and a common vision of our future.

There is no doubt that we are pioneering a "concept on the run". This is occurring out of sheer economic and environmental necessity. Actions will define Sustainable Development much better than words. This conference then, is more than three days of impressive talk and idea sharing. What we are doing is building a unified consensus and setting the stage for meaningful change by governments, by industry and by society.

In simple terms, Sustainable Development means:

- development without destruction;
- growth in harmony with our environment;
- preserving our resource base for our economic well being; or
- simply -- planning for our children's' future. For, in effect, it will be our children who will write the report card on our performance.

With those few words -- it is now my pleasure to officially declare this conference opened!

Environment and Economy
Partners for the Future

L'environnement et l'économie
partenaires pour l'avenir

TITLE: Keynote Speaker
SESSION: Opening
BULLETIN NO.: 1

JOE CLARK, Secretary of State for External Affairs in his keynote address said, "It is evident that the environment and the economy are inextricably and symbiotically linked."

Clark said with new technology, our ability to understand and digest information about the planet is quickly expanding and that the story unfolding is very disturbing.

"The harvest of our economic systems, in terms of greenhouse gasses, deforestation, acidification of lake streams and soils, species extinction, and destruction of the ozone layer, is not sustainable."

He said acceleration of environmental change resulting from our economic activities means that long-term investment projects must now take into account how the world may have changed during that time.

"Economists can no longer assume a predictable climate, free access to pure air and water, or negligible pollution control costs," said Clark. "They must begin to calculate the costs of modifying production processes now, as compared to the future costs of failing to modify them."

He said this means an adjustment challenge to all the industrial and newly-industrializing countries of the world as well as developing Third World countries.

"The world can adjust to changes of this magnitude, if it knows it must."

Clark said there is still a great deal to be learned about economy-environment interactions which are integral parts of stainable development. What is clear, he said, is that they involve an ongoing balance of human harvesting of nature, strategic preservations and anticipating and preventing disasters.

Clark said the principles of sustainable development are being applied to Canadian policy, at home and internationally.

He cited the establishment of the National Round Table on Environment and Economy and the new federal Environmental Protection Act. As well, Clark said more than $900 million a year is allocated by the Canadian Industrial Development Association (CIDA) to improve the management of renewable and non-renewable resources in developing countries.

"We will continue to press multilateral development banks to devote more attention to environmental concerns in the design and implementation of projects," he added.

Clark said a proposal was made to the World Bank last year that it make more information available about the environmental impact of its activities, develop lending criteria where it affects vital resources and promote innovative ways to finance conservation in the Third World.

He also noted a Canadian proposal was put to the UN for the creation of an International Law of the Air, similar to the historic Law of the Sea Treaty.

Other Canadian initiatives include the Montreal Ozone Conference held in early spring. This was followed by a Ministerial meeting in London, Ontario to search for materials to replace current ozone damaging products.

Clark said Prime Minister Mulroney also attended an environmental summit in The Hague where a number of world leaders promised to make global climate change a first order political problem. He said these issues will also be discussed at the upcoming Francophone Summit in Dakar, the OECD in Paris and at the Economic Summit in July.

"There are few precedents for countries agreeing to specific limits on their economic activities for environmental reasons," said Clark. "Scientific opinion on the need for action is far from unanimous and the degree of commitment within and among countries differs widely."

He added that there is also the problem of a shared general concern not being matched by a willingness of particular regions and sectors to suffer.

In most cases, he said, Third World countries are more occupied with poverty, civil strife and economic insecurity, rather than environmental concerns.

Clark said the next few months and years will be critical due to the urgency associated with protecting the environment and the unusually co-operative time in international affairs. These circumstances, he said create a special responsibility for Canada.

"We have good credentials internationally, and on the environment, and we are determined to put that combination to work," he concluded.

SUSTAINABLE DEVELOPMENT: MOVING TOWARDS CONCRETE STEPS FOR INTERNATIONAL ACTION

The Right Honourable Joe Clark

Secretary of State for External Affairs
House of Commons K1A 0A6
Ottawa, Ontario

SYNOPSIS

- A fundamental problem of contemporary society is how to reconcile our economic goals with the natural systems of our planet.
- Environmental change resulting from our economic activities means that economists can no longer assume a predictable environment. They must calculate the costs of modifying production processes now, as compared to the future costs of failing to modify them.
- Sustainable development is about how to make hard choices in situations of scarcity; it is not a way of having your environmental cake and still enjoying the same level of economic development.
- The economy-environment interactions implicit in sustainable development involve an ongoing balance of human harvesting of nature, strategic preservation, and anticipating and preventing disasters rather than reacting after the event.
- Canada is applying the principles of sustainable development to Canadian domestic and international policy.
- At home, the Government adopted a new water policy, preserved significant wilderness areas and created five new national parks, supported the National Round Table on Environment and Economy, and established a new federal Environmental Protection Act.
- On the international level, Canada is committed to:
    - Increasing the share of development assistance dedicated to environmental protection;
    - Pressing multilateral development banks to devote more attention to environmental concerns;
    - Discussing the environment at meetings such as the Francophone Summit next week.
- Canada has a special responsibility to put its good international and environmental credentials to work at this time of increased recognition that it is urgent to act together to protect the environment.

I am pleased that the Government of Manitoba and its Premier, Gary Filmon, have taken the initiative in bringing us together this week in Winnipeg. It is an action which is fully in line with the record it has established in the National Task Force on Environment and the Economy and in its own policies.

This conference addresses one of the most basic conundrums of modern life - how we reconcile our economic goals with the natural systems of our planet.

The organizers of this conference have obviously recognized some basic facts about the nature of the problem. Bringing together representatives from both the public and private sectors across Canada highlights the reality that the environment is not the exclusive responsibility of governments. Similarly the participation of delegates from outside Canada points to another basic fact - that these issues transcend national boundaries.

Not very long ago it was possible to think of the environment and the economy as separate and mutually exclusive.

Today, thanks to the work of the Brundtland Commission and the appearance of global "mega-problems," it is evident that the environment and the economy are inextricably and symbiotically linked.

Farmers in Africa cannot be productive when desertification takes away their land. No more so than farmers in Bangladesh whose lands are washed away by uncontrollable floods. Fishermen on our Atlantic coast cannot stay in business when the fish stocks they depend on are over-harvested.

Astronauts like Marc Garneau, fixed in our minds the image of earth as a single, wispy-edged, planetary spaceship. From outer space, some of the impacts of our economic development are distressingly visible - urban smog, Arctic haze, trails of marine pollution in our oceans. With new technology, our ability to understand and digest information about the planet is expanding by leaps and bounds. The story it tells is, increasingly, very disturbing. The harvest of our economic systems, in terms of "greenhouse gases", deforestation, acidification of lakes, streams and soils, species extinction, and destruction of the ozone layer, is not sustainable. With computers and scientific models, the consequences of current economic trends can be projected ahead and from this we learn that in another two generations:

-- tropical forest could have disappeared;

-- the world could be warmer by 4 - 6 degrees and accelerating;

-- ultraviolet radiation will be a serious threat to animal health and plant yields;

-- species depletion and extinction could have wiped out much of the earth's genetic resources;

-- and arable land could be barely adequate to feed a human population half again as large as today's.

The acceleration of environmental change resulting from our economic activities now means that every investment project with a life longer than 15 - 20 years must take into account how the world may have changed. Economists can no longer assume a predictable climate, free access to pure air and water, or negligible pollution control costs. They must begin to calculate the costs of modifying production processes now, as compared to the future costs of failing to modify them.

Phenomena that were previously local and small-scale are increasingly global in their effects. Each chimney belching carbon dioxide adds to the greenhouse effect, so does each hectare of tropical forest burned down. A pandemic like that of AIDS can spread from continent to continent in weeks; so can newly bio-engineered crop strains.

What, then, does the environmental crisis mean for the way economies are managed, and for our international relations? What we are facing is an adjustment challenge extending to all the industrialized and newly-industrializing countries of the world, and affecting the development plans of Third World countries. To carry conviction internationally, we must show ourselves ready to bear the very considerable costs, and, if necessary, to do so before everybody is signed on. The world can adjust to changes of this magnitude, if it knows it must.

The Brundtland Commission on Environment and Development, in its 1987 report Our Common Future, stated this conclusion in no uncertain terms: "It is impossible to separate economic development issues from environmental resources upon which they must be based, and environmental degradation can undermine economic development". The Report concludes that the environment and the development challenges really are but one challenge, which can only be resolved by a common pursuit.

In other words, sustainable development is about how to make hard choices in situations of scarcity; it is not, as some might think, a way of having our environmental cake and still enjoying the same level of economic development.

There is still a great deal to be learned about the economy-environment interactions implicit in sustainable development, but some points are clear. For one thing, it involves an ongoing balance of human harvesting of nature, such as we have had for centuries in the Canadian trapping industry. For another, it involves strategic preservation - choosing unique sites such as the South Moresby Islands, and giving them appropriate protection. It involves anticipating and preventing disasters, rather than reacting after the event.

We are seeking to apply the principles of sustainable development to Canadian policy, at home and internationally.

We adopted last year a new water policy which provides a framework to manage the essential resource in an environmentally sound manner.

We recognize the value of preserving significant wilderness areas so have created five new national parks in the past four years - Ellesmere Island, Bruce Peninsula, Pacific Rim, South Moresby and Grasslands.

The National Round Table on Environment and Economy, brings together leaders from the business, labour, academic and environmental communities to advise on how best to integrate environmental concerns into economic decision-making. It will present annual progress reports to the Council of First Ministers.

The new federal Environmental Protection Act has guaranteed individual Canadians a role in decision-making affecting our environment.

More than $900 million a year of CIDA's program is allocated to projects designed to improve the management of renewable and nonrenewable resources in developing countries.

We will continue to press multilateral development banks to devote more attention to environmental concerns in the design and implementation of projects. Last year, we proposed that the World Bank should make more information available about the environmental impact of its activities; develop criteria for its lending where it affects such vital resources as rain forests; and promote innovative ways to finance conservation in the Third World.

Last June, Toronto hosted a World Conference on the Changing Atmosphere. The work begun there is now being pursued through the Intergovernmental Panel on Climate Change under the auspices of the World Meteorological Organization and UNEP. A follow-up world conference on this issue will be held next year.

My colleague, Lucien Bouchard, has put forward a proposal to the UN for the creation of an International Law of the Air similar to the historic Law of the Sea Treaty. Three months ago, Canada hosted an international gathering of legal experts to develop and codify international legal principles to protect the atmosphere.

The Montreal Ozone Conference has been followed this Spring in London by a Ministerial meeting to search for materials that could replace ozone damaging products now in use.

In March, Prime Minister Mulroney attended an environmental summit in The Hague where an impressive number of world leaders signalled their intention to make global climate change a first order political problem. These issues will be on the agenda next week at the Francophone Summit in Dakar, the week after that in Paris at the OECD and, in July, at the Economic Summit.

At first glance, it might seem an almost impossible task to achieve the necessary coordinated international responses. There are few precedents for countries agreeing to specific limits on their economic activities for environmental reasons. There are problems in identifying the right international institutions to use, and equipping them with necessary powers. Scientific opinion on the need for action is far from unanimous and the degree of commitment within and among countries differs widely. There is the familiar political problem of a shared general concern not being matched by a willingness of particular regions and sectors to suffer.

These and other concerns affect attitudes in the Third World. These countries tend to regard the greenhouse effect as a problem created by industrialization in developed countries, for which compensation is due. They hold strongly to their sovereignty, and resist, for example, international action affecting control over their tropical forests. In some cases the governments have little control over the use of forests, soil, or water by rural populations or of settlement patterns by urban dwellers. In most cases they are preoccupied by the stresses of poverty, civil strife, and economic insecurity which make environmental concerns seem a distant diversion.

In normal circumstances these impediments would be enough to forestall meaningful action for a long time to come. But these are not normal circumstances, and there is some reason to believe that we can make significant progress internationally.

The next few months and years will be critical. That is for two reasons. One is the wide recognition that it is urgent to act together to protect the environment. The other is that this is an unusually co-operative time in international affairs. The UN enjoys renewed prestige. The superpowers have begun to work together. New trading arrangements have lifted horizons, in Europe, with our own Free Trade Agreement, and in the MTN.

Those circumstances create a special responsibility for Canada. We have good credentials internationally, and on the environment, and we are determined to put that combination to work.

LE DÉVELOPPEMENT DURABLE: VERS DES MESURES CONCRETES POUR UNE ACTION INTERNATIONALE

le très honourable Joe Clark

Secrétaire d'État aux Affaires extérieures
Chambre des communes
Ottawa, Ontario K1A 0A6

Synopsis

- Un des problèmes fondamentaux auxquels la société contemporaine est confrontée est celui de concilier ses objectifs économiques avec les écosystèmes de notre planète.

- Les changements environnementaux provoqués par nos activités économiques signifient que les économistes ne peuvent plus compter sur un environnement prévisible. Ils doivent càlculer le coût que représenterait un changement des procédés de production dès maintenant par rapport à ce qu'il en coûterait à l'avenir si l'on renonçait à les modifier.

- Le principe de développement durable consiste à savoir prendre des décisions difficiles dans des situations de pénurie; il ne s'agit pas de sauvegarder l'environnement comme nous l'entendons tout en maintenant le même niveau de développement économique.

- L'interaction entre l'économie et l'environnement, implicite dans la notion de développement durable exige une exploitation équilibrée de la nature par l'homme, la conservation stratégique ainsi que la capacité de prévoir et d'empêcher les catastrophes au lieu de réagir après l'événement.

- Le Canada applique les principes du développement durable à sa politique intérieure et internationale.

- Au pays, le gouvernement a adopté une nouvelle politique sur l'eau, a protégé d'importantes régions sauvages et créé cinq nouveaux parcs nationaux, a appuyé la Table ronde nationale sur l'environnement et l'économie et a établi une nouvelle Loi fédérale sur la protection de l'environnement.

- Sur le plan international, le Canada s'est engagé à:

    - Augmenter la part de l'aide au développement affectée à la protection de l'environnement;

    - À exercer des pressions auprès des banques multilatérales de développement afin qu'elles accordent plus d'attention aux problèmes de l'environnement;

    - Discuter de l'environnement lors de réunions comme le Sommet francophone qui aura lieu la semaine prochaine.

- En raison de l'excellente réputation dont le Canada jouit sur le plan international et dans le domaine de l'environnement, le Canada a la responsabilité particulière de mettre à profit ce double avantage en cette période où l'on se rend compte de plus en plus qu'il est urgent d'unir nos efforts pour protéger l'environnement.

Je me réjouis de l'initiative du gouvernement du Manitoba et du Premier ministre de cette province, Gary Filmon, de nous réunir cette semaine à Winnipeg. Cette initiative va tous à fait dans le sens des antécédents établis au niveau du Groupe de travail national sur l'environnement ainsi que dans celui des politiques de cette province.

Cette conférence se penche sur l'une des énigmes les plus fondamentales de notre époque - comment concilier les objectifs économiques et la préservation des écosystèmes.

Les organisateurs de cette conférence ont manifestement tenu compte de certaines données fondamentales concernant la nature du problème. Le fait que des représentants du secteur public et du secteur privé, venus de toutes les régions du Canada, se trouvent réunis ici montre que les gouvernements ne sont pas seuls responsables de l'environnement. De même, la participation de délégués venus de l'étranger, témoigne d'un autre fait fondamental - à savoir que ces questions dépassent les frontières nationales.

Il n'y a pas très longtemps, il était possible de considérer l'environnement et l'économie comme deux domaines distincts, qui s'excluaient l'un l'autre.

Aujord'hui, grâce aux travaux de la Commision Brundtland et à l'apparition de "méga-problèmes" globaux, il est évident qu'il existe entre l'environnement et l'économie des liens inextricables et symbiotiques.

Les agriculteurs en Afrique ne peuvent être productifs à cause des effets de la désertification sur leurs terres. Ceux du Bangladesh non plus, étant donné que leurs terres sont dégradées par des inondations auxquelles on ne peut rien. Quant aux pêcheurs de la côte atlantique du Canada, ils ne peuvent continuer leurs activités, les stocks de poissons dont ils dépendent étant surexploités.

Les astronautes, comme Marc Garneau, nous ont rapporté de la terre l'image d'un vaisseau spatial planétaire aux contours fragiles. De l'espace, on peut observer certains effets affligeants de notre développement économique - le smog urbain, le brouillard de l'Artique, les traces de la pollution marine dans nos océans. Grâce à notre nouvelle technologie, nous pouvons à présent mieux comprendre et assimiler plus rapidement les informations concernant notre planète. Ce que nous en retirons est très troublant, et ce de plus en plus. Les effets entraînés par nos systèmes économiques - les gaz dus à "l'effet de serre", le déboisement, l'acidification des cours d'eau et des sols, la disparition des espèces et la destruction de la couche d'ozone - ne peuvent durer. Grâce aux ordinateurs et aux modèles scientifiques, les conséquences des tendances économiques actuelles peuvent être prédites. C'est ainsi que d'ici deux générations:

- les forêts tropicales pourraient bien avoir disparu;
- les forêts tropicales pourraient avoir disparu;
- la température de la terre pourrait se réchauffer de quatre à six degrés et continuer d'augmenter;

- les radiations de rayons ultraviolets seront une grave menace pour la santé des animaux at les récoltes de végétaux;
- la diminution et l'extinction des espèces pourraient avoir fait disparaître de la terre la plupart de ses ressources génétiques;
- et la terre cultivable pourrait devenir à peine suffisante pour nourrir une population humaine deux fois plus nombreuse que celle d'aujourd'hui.

L'accélération des changements dans l'environnement émanant de nos activités économiques signifie, à l'heure actuelle que chaque projet d'investissement visant une période de plus de quinze ou vingt ans doit tenir compte de la façon dont le monde pourrait évoluer. Les économistes ne peuvent plus compter sur un climat prévisible, sur le libre accès à l'air et à l'eau purs, ni sur le coût négligeable de la lutte contre la pollution. Ils doivent commencer à calculer le coût que représenterait un changement des procédés de production dès maintenant, par rapport à ce qu'il en coûterait à l'avenir se l'on renonçait à les modifier.

Les phénomènes qui, auparavant, n'avaient qu'une portée locale et réduite, ont désormais une incidence de plus en plus globale. Chaque cheminée qui crache du gaz carbonique contribue tout autant à l'effet de serre que ne le fait l'incendie d'un hectare de forêt tropicale. Une pandémie comme celle du sida peut se propager d'un continent à l'autre en quelques semaines, tout comme de nouvelles variétés de cultures produites à l'aide de la biotechnologie.

Que signifie donc la crise de l'environnement quant à la façon dont les économies sont gérées et quant à nos relations internationales? Nous sommes confrontés à un problème d'adaptation qui s'étend à tous les pays industrialisés de même qu'au pays en voie de modernisation, et qui se répercute sur les plans de développement des pays du Tiers-Monde. Si nous souhaitons convaincre les responsables du monde entier, nous devons nous montrer prêts à assumer les frais très élevés qu'il faudra engager et, au besoin, avant que quiconque n'en prenne l'initiative. Le monde peut s'adapter à des changements de cette ampleur s'il prend conscience que cela est inéluctable.

Dans son rapport de 1987, Our Common Future, la Commission Brundtland sur l'environnement et le développement a conclu en termes décisifs qu'il est impossible de séparer les questions de développement économique des questions d'environnement; que de nombreuses formes de développement nuisent aux ressources environnementales sur lesquelles elles se fondent, et que la détérioration de l'environnement peut ébranler le développement économique. Le rapport conclut que l'environnement tout comme les problèmes de développement ne sont en fait qu'un seul et même défi, que seule une volonté commune permettra de relever.

En d'autres termes, le développement durable concerne la façon de faire des choix difficiles en situation de pénurie; contrairement à ce que certains pourraient penser, il ne s'agit pas de protéger l'environnement comme nous l'entendons, tout en bénéficiant du même niveau d'expansion économique.

Il reste beaucoup à apprendre au sujet de l'interaction entre l'économie et l'environment, implicite dans le développement durable. Cependant, certains points sont clairs. En premier lieu, le développement durable fait intervenir une exploitation équilibrée de la nature par l'homme, semblable à celle qui a cours depuis des siècles dans l'industrie canadienne du piégeage. De plus, le développement durable passe par la conservation stratégique de l'environnement, dans le cadre de laquelle des sites exceptionnels comme les îles South Moresby sont choisis et reçoivent une protection adéquate. Le développement durable présuppose en outre la capacité de prévoir et d'éviter les catastrophes, plutôt que de réagir une fois la catastrophe survenue.

Nous nous efforçons d'appliquer les principes du développement durable à la politique canadienne, au pays et à l'échelle internationale.

L'année dernière, nous avons adopté une nouvelle politique sur l'eau, qui constitue le cadre dans lequel est gérée cette ressource essentielle d'une façon saine pour l'environnement.

Nous reconnaissons la nécessité de protéger d'importantes régions sauvages, et c'est pourquoi nous avons créé cinq nouveaux parcs nationaux au cours des quatre dernières années, soit ceux de l'île-d'Ellesmere, de la Péninsule-Bruce, du Pacific Rim, de South Moresby et des Prairies.

La Table ronde nationale sur l'environnement et l'économie réunit les dirigeants des milieux d'affaires, syndicaux, universitaires et environnementaux afin de recueillir des conseils sur la meilleure façon d'intégrer les préoccupations environnementales à la prise de décisions économiques. Elle présentera des rapports d'activité annuels au Conseil des premiers ministres.

La nouvelle Loi fédérale sur la protection de l'environnement garantit aux Canadiens un rôle dans la prise de décisions qui touchent leur environnement.

Le programme de l'ACDI alloue chaque année plus de 900 millions de dollars à des projets conçus pour améliorer la gestion de ressources renouvelables et non renouvelables dans les pays en développement.

Nous continuerons à inciter les banques multilatérales de développement à s'attarder davantage aux préoccupations environnementales, plus particulièrement en ce qui touche la conception et la mise en application de projets. L'année dernière, nous avons suggéré que la Banque mondiale diffuse davantage de renseignements au sujet de l'incidence de ses activités sur l'environnement; qu'elle élabore des critères relatifs à ses prêts lorsqu'ils touchent des ressources aussi primordiales que les forêts tropicales humides, et qu'elle fasse la promotion de méthodes novatrices adoptées dans le Tiers-Monde pour financer la protection de l'environnement.

En juin dernier, Toronto a été l'hôte d'une conférence mondiale sur le thème de l'atmosphère en évolution. Le travail qui a été amorcé à cette occasion est maintenant repris par le Groupe intergouvernemental sur le changement climatique, sous les auspices de l'Organisation météorologique mondiale et du PNUE. Une conférence mondiale de suivi sur la question aura lieu l'an prochain.

Mon collègue Lucien Bouchard a proposé devant les Nations Unies la création d'un droit international de l'atmosphère semblable à l'entente historique sur le droit de la mer. Il y a trois mois, le Canada a été l'hôte d'une réunion internationale d'experts juridiques dont l'objet était d'élaborer et de codifier des principes juridiques internationaux visant à protéger l'atmosphère.

La Conférence de Montréal sur la protection de la couche d'ozone a été suivie au printemps, à Londres, par une réunion ministérielle dont le but était de trouver des produits pour remplacer ceux actuellement utilisés qui nuisent à la couche d'ozone.

En mars dernier, le premier ministre Mulroney a assisté à un sommet environnemental à La Haye, où un nombre impressionnant de dirigeants mondiaux ont exprimé leur intention de considérer le changement climatique global comme une préoccupation politique de premier plan. Ces questions seront à l'ordre du jour du Sommet de la francophonie, qui se tiendra à Dakar la semaine prochaine, et à celui de l'OCDE à Paris la semaine suivante et enfin en juillet au programme du Sommet économique.

À prime abord, il peut sembler pratiquement impossible de mettre en place les mesures internationales coordonnées qui s'imposent. On trouve bien peu d'exemples de pays qui ont consenti à imposer des limites spécifiques à leurs activités économiques pour des limites spécifiques à leurs activités économiques pour des raisons environnementales. Par ailleurs, il demeure difficile de savoir quelles institutions internationales utiliser et comment les investir du pouvoir nécessaire. L'opinion du milieu scientifique quant à la nécessité d'agir est loin d'être unanime et le degré d'engagement varie grandement à l'intérieur des pays et d'un pays à l'autre. En outre, il arrive souvent que certaines régions ou certains secteurs refusent de faire les frais d'un problème qui préoccupe par ailleurs l'ensemble d'une communauté.

Ces problèmes et d'autres influent sur l'attitude du Tiers-Monde. Ces pays considèrent généralement que l'effet de serre est un problème créé par l'industrialisation des pays développés, et pour lequel une compensation leur est due. Ils tiennent fermement à leur souveraineté et se montrent réticents, par exemple, à des mesures internationales qui supposent un contrôle sur leurs forêts tropicales. Dans certains cas, les gouvernements exercent un contrôle très limité sur l'usage que les populations rurales font des forêts, du sol ou de l'eau, ou sur le mode de développement des zones urbaines. Dans la plupart des cas, ils sont préoccupés par les contraintes de la pauvreté, les conflits internes et l'insécurité économique, problémes à côté desquels les questions environnementales leur paraissent une préoccupation fort secondaire.

Dans des circonstances normales, de tels obstacles suffiraient à compromettre pour plusiers années toute action positive. Mais ce ne sont pas des circonstances normales, et nous avons quelque raison de croire qu'il nous est possible de faire d'importants progrès au plan international.

Les prochains mois et les prochaines années seront critiques; il y a à cela deux raisons: la première est la nécessité largement reconnue d'agir ensemble sans plus tarder pour protéger l'environnement. La seconde, c'est que la conjoncture internationale se prête particulièrement bien à une coopération. L'ONU a retrouvé son prestige. Les superpuissances ont commencé à collaborer. De nouveaux accords commerciaux libèrent de nouveaux horizons, que ce soit en Europe, avec notre propre Accord de libre-échange ou dans le cadre des NCM.

Ces circonstances créent une responsabilité particulière pour le Canada. Nous jouissons d'une excellente réputations ou plan international tout comme dans le domaine de l'environnement, et nous sommes déterminés à mettre à profit ce double avantage.

TITLE: Perspectives on Sustainable Development
SESSION: Panel Discussion
BULLETIN NO.: 2

COLIN ISAACS, Executive Director of The Pollution Probe Foundation, was asked to address the general public's perspective on sustainable development. "To be brutally frank, the truth is that so far, the public does not have a perspective," he said. Instead, he opted to suggest the perspective shared by many in the environmental movement, and the basic rules to follow in shaping public opinion.

"Environmental groups are a cynical lot," said Isaacs. "In my opinion, by taking months to set up round tables, and by holding conference after conference with no follow-up action, governments are fiddling while Rome burns," he said. "Talking is no substitute for action."

Isaacs criticized governments for their propensity to label old programs with new names. To hear the speeches and read the brochures, you might think that everything Canada is doing is sustainable development. "There isn't any sustainable development happening in Canada yet," he said.

Isaacs stressed the importance of planning as an essential part of sustainable development. "I've heard talk that we need a few quick sustainable development demonstration projects and that makes me nervous," he said. He suggested that if a project is quick it probably has not been properly planned. Crucial to the planning stage is a public environmental impact assessment, including public hearings which provide the opportunity for people outside the project planning group to review the project, inspect it and to challenge it, he said.

Environmentalists are concerned that changing the name of sustainable development to sustainable economic development is to alter the concept, said Isaacs. "That's wrong," he said. "It's not the economy or the economics that we are trying to sustain, it's the environment and the economy that we are trying to sustain."

Lastly, environmentalists believe that sustainable development requires an ecosystem approach. "Projects which dramatically change the environment or which are happening without reference to the surrounding environment or biosphere just don't qualify," Isaacs said.

The public perspective is still in the formative stage, suggested Isaacs. "Depending on the poll, depending on who you talk to, it is either government or industry who is least responsible, most irresponsible," he said. Nevertheless, he suggested ten rules on how to shape public trust and ensure a better environment.

1. Begin at the beginning in dealings with the public. Do environmental assessments before approving a project.
2. Don't rush the building of trust. Industry, environmental groups and governments need to take time to find ways of working together.
3. Don't bury the original problem. Secrecy can destroy the company, or the politician, who tries to thwart the public's right to know when it comes to impairment of the environment or threat to community health.
4. Don't use bafflegab.
5. Be frank, honest and informative with answers. Don't exaggerate---the problems are serious enough already.
6. Be open to review and be seen to make changes where changes seem necessary. A take-it-or-leave-it approach, backed up by threats to pull out, will encourage the public to tell the proponent to "stuff it."
7. Be open from Day One or earlier. An open and helpful approach to dealings with the local citizens will likely help rather than hinder your proposed project.
8. Identify the game plan clearly. Today, multi-stakeholder consultation is playing a small but increasing part. If you do not know the game plan, you don't know whether to toss in a tough unyielding position or whether to begin the delicate art of compromise.
9. Get more people involved. A more diverse range of opinions will actually assist decision-making, because more people will work to understand the other points of view.
10. Last but by no means least, show support and offer help to environmental groups. You can help them do their job better and that can only help all of us in our quest for the best available environment.

THOMAS D'AQUINO, President and CEO of the Business Council on National Issues (Ottawa), addressed the opportunities and challenges making responsible environmental behaviour compatible with robust economic development.

"It's going to be tough, costly, and painful," said D'Aquino. But environmental development is attainable, he said. Looking on the positive side, D'Aquino said twenty years ago, environmental concerns were mainly the preoccupation of the young and that government and business did not care very much. "Today, it is a major concern of all age groups and sectors and Environment Canada has become an important ministry," he said.

D'Aquino cited the growing number of businesses which are working to make their organizations environmentally safe. He left no doubt that the Chief Executive Officer is also the Chief Environmentalist.

Although these are positive signs, D'Aquino questioned whether we are moving fast enough and far enough. He stressed the need for business to become intolerant to waste and defoliation. "Business is a key player and has to face up to its responsibilities and show leadership," D'Aquino said.

In closing, he warned that tougher environmental laws will come into place and it is better to lead than to be legislated.

TOM McMILLAN, Chair of Focus 2000's Task Force on Environment for the Canadian Chamber of Commerce explored the link between a strong economy and a healthy environment. "What is good for the environment is good for business," said McMillan. "Businesses which do not react or ignore change will flounder and self-interest is as strong a motivator for change as altruism."

McMillan said compliance with environmental laws is the single most important responsibility of all. "It is not enough for business to comply with the law, they must fully integrate their economic decisions with the environment," he said.

In closing, McMillan said the national task force would welcome any help in formulating environmental guidelines for medium and small business.

DAVID JOHNSTON, Chair of the National Round Table on Environment and Economy, spoke to the challenges of sustainable development facing individual members of society. "The latent public desire for change is enormous," said Johnston, "and we cannot afford a backlash from the Canadian public."

He suggested that the round tables can have an important impact as a forum where real life trade-offs can happen. "We can use our knowledge and connections to build strategic partnerships and broaden our consensus," said Johnston. He cited their objectives as: to increase awareness and promote environmental values; to create new partnerships for a national approach; and, to promote new institutional practices.

ISSUES RAISED FROM THE FLOOR

- A call for a clear and concise definition of sustainable development.
- Complaints that environmental groups and environmentally conscious individuals were excluded from participation in conference.
- A concern that we are safeguarding all species and interfering with the course of evolution.
- A request for clarification on the function of the federal government's Centre for Sustainable Development.
- A call on governments for practical solutions instead of grandiose policy statements.
- How can our transportation system become a part of sustainable development?
- A strong public demand for governments to engage in less talk and to "get on with it."
- A need for the concept of sustainable development to be integrated into the school curriculum.
- Concern that sustainable development is simply political rhetoric and will fall by the wayside with a change of government.
- A call for strong political and private sector leadership.
- A need to explore alternative fuel sources.
- Recurrent reminder that time is running out to change attitudes and practices in relationship to the environment.
- Criticism of governments' allocations of funds to support inappropriate technology instead of environment friendly technology.
- Canada has a major role to play in providing economic solutions for developing countries.

SUSTAINABLE DEVELOPMENT: THE PUBLIC'S PERSPECTIVE

Colin F. W. Isaacs

Executive Director, The Pollution Probe Foundation
12 Madison Avenue
Toronto, Ontario M5R 2S1

I appreciate the opportunity to speak today on the theme "Sustainable Development - The Public's Perspective." I hate to be brutally frank, but the truth is that so far, the public does not have a perspective.

But, so as not to waste my fifteen minutes, I'm going to suggest the perspective of many in the environmental movement, the perspective that the public most likely would have if it had one, and the role and perspective that the public could have if some of the larger players do things right!

Pollution Probe's twenty years have seen major changes in the environmental approach taken by all sectors of Canadian society. Twenty years ago there were no provincial environment ministries, the public had never heard of acid rain, DDT was to be found under the sink in many kitchens, and pollution, if ever considered, was regarded by most people as the black smoke coming out of factory chimneys! Today's problems, including PCB's, dioxins, ozone depletion, and destruction of tropical rainforest, were hardly a glimmer on the environmental horizon in 1969.

The last twenty years have seen growth in the amount and diversity of environmental regulation and legislation across Canada and we have heard a cacophony of promises, threats and excuses from ministers, bureaucrats, boards, panels, and agencies of every kind. Governments have attempted to protect the environment through crisis management, leaping from yesterday's crisis to today's crisis, without plan, without direction, and without memory for where we have come and how we have got into this mess.

I expect the next decade to be one of more useful change. Sustainable development will play a big part in developing and refining that change. The Brundtland report told us that avoiding environmental catastrophe must be our greatest priority today, that the problems are becoming so serious that they threaten our economic security, that we can no longer afford to mess up now and clean up later (react and cure), and that (the good news) we shouldn't even think of solving our environmental problems by moving backwards. The Brundtland Commission said not only that a healthy economy and a clean environment are compatible objectives, not only that we can have jobs and environmental protection, the report said we MUST, because if we do not adopt a strategy of sustainable development, the polluted environment will destroy our economy.

But you know as well as I do that environmental groups are a cynical lot, so I'm going to spend a few minutes suggesting what I hear around the environmental groups in Canada and the U.S., things you might watch out for when you hear those words sustainable development. Sustainable development is a path that can lead us away from the brink of environmental disaster, but it is also a platform of words under which many inappropriate thoughts are lurking.

First, talking sustainable development and setting up committees and round tables is no substitute for action. We need action now and I truly urge all of you not to be lulled into a false sense of security by all the words that have been spoken in the two years since Brundtland was published.

Second, sustainable development is not a new name for carrying on in the same old way. The Brundtland Commission makes it abundantly clear that major social and economic change is needed now. I emphasize major. In my opinion, by taking months to set up round tables, and by holding conference after conference with no follow-up action, governments are fiddling while Rome burns. Today it is almost too late to call the environmental fire brigade; tomorrow it may be too late.

Associated with this second point is the propensity of government to label old programs with new names. There isn't any sustainable development happening in Canada yet, because political leaders and all but a few senior bureaucrats are only just beginning to understand what sustainable development means. Yet to read the speeches and the brochures you would think that everything Canada is doing is sustainable development!

Point three: sustainable development does not mean less government regulation. The Brundtland Commission tells us very clearly that governments have a major role to play in helping to develop strategies for sustainable development and in entering into conventions, treaties, legislation and regulation to ensure that sustainable development comes about for all sectors of society in all countries.

Point four: planning is an essential part of sustainable development. I've heard talk that we need a few quick sustainable development demonstration projects. That makes me nervous: if they are quick, they probably haven't been properly planned, and if they haven't been properly planned, the proponents have probably not investigated all of the potential long-term environmental impacts. In particular, public environmental impact assessment, including public hearings, is an essential part of sustainable development, because it provides the opportunity for people outside of the project planning group to review it, to inspect it, and to challenge it. Only after that challenge can we be as sure as it is humanly possible to be that the project is indeed sustainable.

Point five: sustainable development is sustainable development, not sustainable economic development, not sustainable DEVELOPMENT, but almost one word, sustainabledevelopment. Many environmentalists have complained that once again business has won: that business got the noun, the action word development, while we got the adjective, sustainable. I think that that is a reasonable concern. Many have already changed the phrase to sustainable economic development.

That's wrong. It's not the economy or the economics that we are trying to sustain, it's the environment and the economy that we are trying to sustain. So don't play with phrase, and don't allow the noun development to be used as an excuse for yet more pointless growth: sustainable development clearly means development in controlled quantity, enough to meet the globe's economic and environmental needs, and no more.

Point six: sustainable development requires an ecosystem approach: integration of the activity with its environment and with the biosphere. Projects which dramatically change the environment or which are happening without reference to the surrounding environment or the biosphere just don't qualify. It is because we have continually changed the environment that we have got ourselves into the mess that we are in today: continuing to change the environment in a major way under the guise of sustainable development is a recipe for disaster. Environment is a word that we use very loosely to describe the plethora of natural systems that have led to the development of life on this planet and which nourish it today. Those systems cannot be changed by human activity without risking the possibility, increasingly a probability, that they will flip to a new mode unable to support life as we know it. The economy, on the other hand, is essentially a human invention, capable of change to meet our needs and now needing change in order to ensure that our planet is able to continue to support life as we know it. Remember, sustainable development requires maintaining the ecosystem: it is in the economy that change is needed.

Industry and government are perceived, by the public, as the perpetrators of a major outrage to the environment. Depending on the poll, depending on who you talk to, it is either government or industry who is least responsible, most irresponsible. Some recent polls have shown that that the public has even less confidence in government to deal with the environmental imperative than it has in industry, and I suggest to you that maintaining that situation is in industry's best interest. Don't get me wrong -- I'm not suggesting that government should continue an inept approach to finding solutions to our very serious environmental problems! What I am suggesting is that it is probably in everyone's best interests if industry works hard to stay ahead of government in environmental performance.

It is with this goal in mind, to help you to help us and to help us to help you achieve our joint goal of sustainable development, an economy and an environment that we will be proud to leave to our children, that I want to spend my last few minutes sharing with you some rules how to win, and how to lose, public trust and a better environment.

Rule 1) Begin at the beginning in dealings with the public. The public will not accept being told that certain aspects of a proposal are not debatable, especially if no clear reason can be given for the entrenched position. Doing environmental assessment after new developments have been approved is one way for government to demonstrate that it has not integrated environmental and economic planning.

Rule 2) Don't rush the building of trust. The Ontario Blue Box recycling program, now serving over 1.2 million homes with curb side recycling, has been an enormous success because the soft drink industry, environmental groups and governments took the time to find ways of working together. The industry association, Ontario Multi-Material Recycling Inc., stands tall as an example of effective industry environmentalism.

Rule 3) Don't bury the original problem. PCB's are a classic example of decision makers getting themselves in trouble because they put the facts on the back burner. PCB's exist in every urban neighbourhood right across Canada. Low level PCB's are in transformers atop tens of thousands of Hydro poles almost everywhere. If the public understood, gaining approval for solutions would be easier. Secrecy, an understandable part of corporate competition, will destroy the company, or the politician, who tries to stand up to public right to know when it comes to impairment of the environment or threat to community health.

Rule 4) Don't use bafflegab. The public is very sensitive to bafflegab and it rebels quickly when it sees that terms are being used in an inexplicable effort to reduce the apparent seriousness of the problem. Let's stick with the simple, clear terms that everybody can understand.

Rule 5) Be frank, honest and informative with answers. Don't go beyond what you can justify, especially if you are presenting a scientific viewpoint. Don't use phrases like "We have to trust the experts" because the public doesn't trust experts. Whether it's in football, or politics, or the environment, the public is rapidly discovering that experts can be found on all sides of any issue. Increasingly, participatory democracy is leading to a situation where the public thinks it knows as much as the experts, and sometimes it does. A corollary to to my "be frank with answers" rule is the compelling need to avoid absurd or irrational positions. Don't exaggerate - the problems are serious enough already.

Rule 6) Be open to review and be seen to make changes where changes seem necessary. Past projects often went down to defeat because they were offered by the proponent as a take it or leave it situation. A take-it-or-leave-it approach, backed up by threats to pull out, will encourage the public to tell the proponent to "stuff it".

Rule 7) Be open from Day One or earlier. Dow Chemical won a great deal of respect because it told Pollution Probe and, I assume, other environmental groups as well, about the toxic blob situation before the story hit the papers. Pollution Probe was able to be much more supportive of Dow's cleanup program because our response was that much better informed. Tricil recently won approval for an extension to its industrial landfill facility outside Sarnia much more easily than the average municipal landfill is approved, in major part because it was open and helpful in its dealings with the local citizens and with the major environmental groups who were interested.

Rule 8) Identify the game plan clearly. Traditionally an adversarial approach has been used for environmental decision-making. Today, multi-stake holder consultation is playing a small but increasing part. The adversarial and consultative approaches are not compatible. If you do not know the game plan that is being played, either by the other stakeholders or by the government, you don't know whether to toss in a tough unyielding position or to whether begin the delicate art of compromise.

Rule 9) Get more people involved. While large crowds may seem intimidating, better decisions truly come from more players. A more diverse range of opinions will actually assist decision- making, because more people will work to understand the other points of view. Remember that there is not a single issue about which everyone agrees - that's why we have processes to ensure that the final decision is made.

Rule 10) Last but by no means least, show support and offer help to environmental groups. Members and supporters of environmental groups generally have no economic stake, or at most, a very small economic stake in the outcome of the projects in which they are involved. Doing any job properly takes economic resources. By supporting environmental groups operating in your geographic or policy area you can help them do their job better, and that can only help all of us in our quest for the best available environment.

ENVIRONMENT AND ECONOMY: UNTIL DEATH DO THEM PART

Thomas D. d'Aquino

President, Business Council on National Issues (BCNI)
Royal Bank Centre, Suite 806-90 Sparks Street
Ottawa, Ontario K1P 5B4

ABSTRACT

The call for sustainable development has become a rallying cry for a growing number of Canadians and citizens in every part of the world. It reflects an understanding that vigorous economic growth and environmental enhancement can be mutually reinforcing.

In these remarks, the author appeals for wider recognition of this fact and outlines some encouraging developments supportive of environmental enhancement. Some of the major challenges ahead are discussed as are the responsibilities of business.

This address follows in the wake of the formation of a Business Council Task Force on the Environment and the Economy chaired by Thomas Kierans, President of ScotiaMcLeod Inc. and composed of twenty-five chief executives.* The Task Force has begun its work of encouraging greater environmental awareness and the development of effective and practical ways of integrating the environment and the economy.

The Business Council on National Issues is composed of the chief executive officers of 150 leading Canadian enterprises. As a non-profit, non-partisan organization, it seeks to contribute to the development of sound public policies in the national interest.

The Chairman of the Business Council is David M. Culver, Chairman and Chief Executive Officer of Alcan Aluminium Limited.

***"The Earth is one but the world is not."**

When I first read this opening line of the Brundtland Report, I was struck that so few words could deliver such a strong message. The image of two starkly contradictory realities crossed my mind.

At this ground-breaking conference hosted by the Government of Manitoba, we are grappling with what some consider to be the irreconcilable forces that flow from these two realities -- a wholesome environment and vigorous economic development. It is my belief that these are not irreconcilable. Far from it, they can and must be made mutually reinforcing. There no longer can be any doubt -- the cost of failure will be fatal and will lead inevitably to the destruction of planetary life as we know it. Hence my choice of title "Environment and Economy -- Until Death Do Them Part."

As part of this panel session on "Perspectives on Sustainable Development," I have been asked to present mainly a business perspective. **Let me say at the outset that the business leaders who make up the Business Council on National Issues share my conviction that reversing the deterioration of the environment on a global basis is the most important challenge facing Canadians and citizens of the world.** My colleagues and I are equally convinced that the response to this challenge will be found primarily in vigorous but responsible economic development -- economic development which harnesses and adapts the positive creativity of technology and market forces; economic development based on enlightened public policies capable of drawing from the private sector the highest level of commitment; economic development that can contribute towards our health and the health of our environment.

Meeting the challenge will be tough, costly, and at times painful. But I have not come here today to present you with a gloomy message about the elusiveness of the finish line. On the contrary, I am reasonably confident, despite the massive obstacles, that environmentally sustainable development is attainable and that the business community will play a central role in reaching this goal.

An Encouraging Beginning

Let me begin with a brief progress report. When I think of the environmental challenge, at times I experience a strong sense of deja vu. For years we have been warned about the deterioration of our ecosystem. I quote from The Environmental Handbook, published by Friends of the Earth in 1970: "There is a generation ... demanding better answers ... about our environment. They speak out in this book with an urgency born of the realization that time is running out.... In many cases we have damaged the environment beyond repair." These words, although published almost **two** decades ago, are painfully relevant today.

But let us look at the positive side. Twenty years ago, concern about the environment was mainly a preoccupation of the young. Our hair was longer then, we talked of new streams of consciousness, we questioned the impact of "mindless" technology. With few exceptions, politicians, business people, and the public generally did not understand or care much about what we were saying.

Contrast this with the scene today. In Canada alone the environment has become a major concern of citizens in **all** walks of life and of **all** age groups. People in growing numbers are asking what they can do to help. Media coverage is unprecedented. Environment Canada has become a senior ministry strongly supported by the Prime Minister. The work of the Brundtland Commission, a major force in increasing our awareness and a much-needed catalyst in pushing the environment to the top of the policy agenda, has been widely acclaimed in this country. The Canadian Council of Resource and Environment Ministers (CCREM) National Task Force gave further impetus to the environmental cause with an action-oriented report in 1987. And more recently the momentum has accelerated with the establishment of provincial and national Round Tables.

Faced with this astonishingly rapid series of events, the Canadian business community is confronted by the dual challenge of adapting to change and providing convincing evidence to the public that it is committed to protecting our environment and safeguarding our health. In politics, pictures are worth more than a thousand words -- they are the lasting images which frame public perceptions. Who among us will ever forget the television footage of the oil slick spreading its deadly net across Prince William Sound in Alaska? One of the side-effects of this kind of unqualified disaster is that it can negate many environmental corporate success stories which often go unnoticed, causing people to ignore the progress of business in responding to the environmental challenge.

Let there be no doubt, the progress is real and it is significant. Businesses that have been environmentally active for years are now being joined by a host of others. For example, the Canadian Petroleum Association has developed an Environmental Code of Practice. The Mining Association of Canada has adopted an Environmental Policy. The Canadian Chemical Producers' Association has established a comprehensive "Responsible Care Program" designed to minimize the risks that chemicals pose to the environment. The Grocery Products Manufacturers' Association and the Society of the Plastics Industry are developing waste management programs. Other business associations, including the Canadian Chamber of Commerce and my own Business Council on National Issues, have formed task forces to design practical recommendations on integrating environmental enhancement with economic development. At the corporate level, many companies are working to make their organizations environmentally conscious in every activity, whereby **all** decisions eventually will require explicit consideration of their environmental effects.

This encouraging news of course is not limited to Canada. The leadership challenge is being readily grasped by a growing number of global enterprises. Take for example the announcement two weeks ago by E. S. Woolard, the newly appointed Chairman of E.I. duPont de Nemours and Company. "Our continued existence as a leading manufacturer requires that we excel in environmental performance," he said. And he left no doubt as to his role, pointing out: "that as DuPont's chief executive, I'm also DuPont's chief environmentalist."

Environmental consciousness is not confined to heavy industry. A major Quebec financial services group is devising an environmental code of ethics: subscribing members will not lend money to borrowers that fail to meet provincial environmental guidelines.

These and other unpublicized examples are no cause for complacency, but I hope they will help people understand that the business community is embracing the precept that proper environmental management is good business -- for everyone.

The Challenge Ahead

Even in light of some constructive activities and other positive signs, I still ask, are we moving far enough or fast enough in achieving an environmentally sustainable society? I will address this point by describing some of the challenges I see.

The first, and perhaps the most important, concerns our values and attitudes and the way we think about our environment. How are we going to convert our approach of the past, which has led to our current predicament, to a new, environmentally compatible one that will lay the foundation for a long-term balance between environmental and economic interests? How will we promote a much higher level of societal awareness, one that will help us to better understand the implications of environmental degradation for the way in which we go about our lives? How do we make ourselves and others more intolerant of waste, of needless despoliation, or of unnecessary use of non-renewable resources? We can be heartened somewhat by the successes of, for example, the anti-smoking campaign and blue box programs -- but not too much, since the changes we must make must be much wider and deeper. As an illustration, consider the potential lifestyle changes implicit in a concentrated attack on greenhouse gases: among other things, we will have to cut down the emissions of carbon dioxide from internal combustion engines that power our vehicles.

A second challenge is related to this. The Western world consumes a disproportionate share of the world's resources. It is said that the United States, for example, with 6% of the world's population, uses 30% of these resources. Developed countries are now banning products such as chlorofluorocarbons (CFC's) and adopting new standards for effluents, such as those from vehicle emissions and coal burning, which are harmful to the environment. Such measures are costly, of course. Developing countries can be expected to argue that they cannot afford to adopt them. This poses, then, a double dilemma for Western economies. Will our new, cleaner industries be forced to compete against cheaper, "dirty" producers in the Third World? Or, will we find it necessary to transfer large amounts of capital and technology to developing countries to enable and encourage them to keep pace? Any plans for implementing environmentally sustainable development must come to grips before long with the world's economic disparities.

My third point also is connected to the first, but I mention it separately for emphasis: the preponderance of short-term thinking, especially among governments and some businesses. Given the lengths of political mandates, it is inevitable that politicians will pass laws that deliver short-term results. However, this can easily lead to reactive, piecemeal solutions, often focussing on symptoms rather than the real problems. In a paper submitted to the Brundtland Commission, three American experts noted some of the difficulties of relying upon short-term goals. For example, they claimed that legislative emphasis on "end-of-pipe" pollution controls has led to a regulatory mentality that relies on controls to solve environmental problems at the expense of alternatives. They suggest that the high expense of complying with control regulations has resulted in a commonly held view that there must be a trade-off between jobs and environmental protection. How will we promote a longer-term focus so that government and industry can encourage the development of better alternatives and help give the lie to the need for trade-offs? Since business responds much better to market and fiscal carrots than to regulatory sticks, what economic incentive models can be developed to help attain public and private sector environmental objectives?

Industry, for its part, has been criticized, sometimes justifiably, for its preoccupation with quarter-to-quarter results. The paper to which I have just referred provocatively poses some questions for executives to ask when considering a new product. "Will manufacture or use of this product be harmful to people and/or the environment?" "Is this the best design...built to last...easily repairable or recyclable?" "Is there a **real** need for this product, or is it merely our perceived need?" The authors imply that management will have to answer more questions like these if corporations are to make a positive contribution towards long-term sustainability. Whether you agree with that or not, it is hard to ignore one of the paper's conclusions: corporations have an enormous responsibility to subject their activities to an environmental litmus test in order to help propel society toward long-term sustainability.

My fourth point concerns the need for more cooperation and consultation, especially among those whose relationships historically have been adversarial. Both the Brundtland Commission and the CCREM Task Force are testimonies to the ability of groups with widely different views to reach substantive common agreement on important issues. In such cooperation lie the seeds of more creative and thorough solutions to our problems. The challenge will be to design the mechanisms and, more than likely, new national and international institutions such as the Round Tables, and to make them work.

Yet another challenge is for economists and accountants to develop new macroeconomic tools to assess the societal implications of environmental changes. The economists' traditional approach -- measuring marginal costs against benefits and weighing alternative uses of the environment -- is inadequate due to poor or unavailable data. Related to this, parenthetically, is the need for a satisfactory environmental data base. It is heartening to note that Statistics Canada is a leader in this area through its work on adjusting the National Accounts.

New economic methodologies are needed. For example, there must be practical and fair ways to ascribe a value to air and water and to their use. From a corporate perspective, new ways must be found to allow companies to measure environmental improvements which would justify optimum technology and result in higher long-term returns -- to the corporation and to society. Improved accounting techniques are needed to assess the potential liabilities of businesses arising from delays or gaps in investments in environmental measures. These and other fundamental issues must be addressed before environmental factors can be fully recognized in investment decisions -- as they must be -- and better understood in public policy debates.

Finally there is the fiscal dimension. Meeting the environmental challenge will require a significant reordering of global economic priorities, to be sure. And what about Canada? We are a country plagued by chronically high public sector deficits and skyrocketing debt. The costs of fiscal mismanagement will impede our ability to reorder our own economic priorities. The hard fact is that our will to address environmental imperatives must be backed up by strong national and provincial fiscal positions. Have we really understood this yet? I do not believe so.

The size of these challenges is daunting. But it is important that we not tackle them so slowly that we let ourselves become discouraged. We therefore must move away from an "ad hoc" approach to one that is more systematic, one in which our leaders articulate a vision and set priorities.

The Responsibilities of Business

The business community, no less than any other, has to face up to its responsibilities and exercise leadership. My next comments apply not only to those firms that are moving to operate more sustainably, although unfortunately they are in a minority, but to almost every business, large or small, dirty or clean. The task must be to integrate the environment and the economy in decision-making as if your lives depended on it!

Up to now, environmental considerations often have been treated as an "add-on" to business decision-making. In the future, they will have to become as **systemically** a part of the management process as financial matters. In other words, the environmental effects of every decision, whether it deals with safety standards, products, investments, new processes, purchasing, office management, or factory design, will have to be recognized.

Improved front-end planning to assess the potential risks of new activities is only the first step. This must be accompanied by effective environmental management and control measures and emergency response plans. Reclamation systems as part of the life-cycle management of industrial activities should be developed. Invariably, there will have to be more vigorous self-regulation by corporations and industry associations.

These approaches often will result in new planning and decision-making processes and revised corporate structures and responsibilities. For example, accountability for decisions affecting the environment must be clearly defined and the reward systems modified accordingly. The changes can be complex and interrelated, so they must be handled systematically and not allowed to develop in an "ad hoc" way.

There are some who may be deterred by the perception of increased expenses or capital investments with no corresponding financial return. I have two responses to this point of view. The first one is that tougher environmental measures will come sooner or later so it is better to take the lead rather than be legislated into compliance. Besides, the cost argument is a weak defence for any corporation resisting environmental change. Any idea that profits should take precedence over public health is unacceptable to the public, let alone politicians or even the shareholders and employees. Nor, in many cases, does it make sense financially because it is more advantageous and often less expensive to prevent environmental problems than to clean them up after they have occurred.

More important, though, business has to recognize its ethical responsibilities. As part of the problem it also must be part of the solution, and the key here is that solutions need not impose unmanageable financial burdens. Creative and common-sense approaches such as selling recaptured and recycled waste and marketing new technologies have often led to gain, not pain. Furthermore, there are advantages from investing in long-term technology whose environmental benefits exceed current or even planned standards. By leap-frogging current norms, corporations can gain financially by reducing their expenditures below what they will have to spend to catch up. Indeed, businesses can improve their competitiveness in the market-place by positioning themselves as environmental leaders. The introduction of "environmentally friendly products" in Canada is just one such opportunity. In macroeconomic terms, the experience of member countries of the Organization for Economic

Cooperation and Development (OECD) has shown that measures to protect and improve the environment can generate employment and other significant economic spin-offs.

Some senior executives may be uncomfortable in adapting to such new circumstances. To them I emphasize that the commitment to make these changes must come from the very top. Progress will be slow for those firms that fail to recognize that changing the attitudes and processes which make up a corporate culture needs unwavering support and example at board and senior management level. Once commitment has been secured, everyone in the business must become involved to help ensure success.

Successfully managing change, of course, requires a long-term perspective. This will require that management look well beyond its own industry to environmental impacts on other industries and on society in general. This is not to suggest that this process does not now exist; rather, that it should occur more often and more broadly, and the sooner the better.

As I have said, the business community in Canada is responding to the call for environmentally sustainable development. The person in the street would be pleasantly surprised at the actions behind the scenes. I am confident that a year from now I will be able to provide many substantive examples of improvements arising from current initiatives.

We are willing -- and indeed it is critical for us -- to discuss environmental issues with other groups in society, including governments, and work with them toward solutions. The Business Council on National Issues Task Force on the Environment and the Economy is charged with this responsibility. But I emphasize that consultation will not finish on publication of our findings. If ever an issue were designed for consensus-building, the environment and the economy is it. I would add that this applies both domestically and internationally for business, governments, NGO's and the scientific community. Together we should be providing multi-stakeholder input to questions such as "who pays?" -- the polluter, the consumer or the taxpayers? And we should be taking steps to better understand and resolve macro-environmental issues such as global warming, nitrogen oxide build-up, and world deforestation, where industry's technical expertise and know-how can be put to greater use.

This appeal for co-operative action is based on two deeply held convictions on my part. First, the challenge we face is so great and so urgent that it demands an approach that sets aside many of our practised differences and works vigorously towards "our common future." Second, business is vital to our economic development and a key participant in the search for environmental solutions. Old attitudes towards business must not stand in the way of the development of new working relationships among all players in the community.

The Earth is One But...

In sharing these thoughts with you today, I return to where I began and the opening line of the Brundtland Report. Sadly, it remains largely true that "The Earth is one but the world is not." But the world is rapidly changing. Powerful messages are blowing in the winds, floating in our waters, and criss-crossing our lands. The messages are ones that leaders everywhere are beginning to understand -- that the family of man is indeed one, that our common life-supports are in danger, that time is running out, that in cooperation lies our only salvation.

I must credit Dr. Digby McLaren, President of the Royal Society of Canada, for finding words that so aptly sum up what I am trying to say. At the end of a superb article on the Health of the Planet, he quotes Chief Seattle of the Suquamish people of the Pacific Northwest who wrote to President Pierce in 1855:

> **"This we know, the earth does not belong to man; Man**
> **belongs to the earth. All things are connected like the**
> **blood which unites one family.**
> **Whatever befalls the earth, befalls the sons of earth.**
> **Man did not weave the web of life. He is merely a strand**
> **of it.**
> **Whatever he does to the earth, he does to himself."**

BUSINESS AND SUSTAINABLE DEVELOPMENT IMPACTS AND OPPORTUNITIES

Tom McMillan

Chairman, FOCUS 2000, Task force on Environment
Canadian Chamber of Commerce
55 Metcalfe
Ottawa, Ontario K1P 6N4

Mr. Chairman, Premier Filmon, Minister Clark, Fellow Panelists, Ladies and Gentlemen, Friends:

Let me begin by saying how glad I am to participate in this environment and economy conference.

Earlier in the year, I accepted an invitation from the Canadian Chamber of Commerce to chair its task force on the environment. The very fact that the Chamber has established such a task force underscores the growing recognition in business circles that the environment and the economy are inextricably linked.

The Task Force on the environment is one of several task forces the national chamber created under its FOCUS 2000 project. Four others have already reported upon (respectively) entrepreneurship, harnessing change, investment capital, and science and technology.

The FOCUS 2000 project was launched to help provide, in the words of President Roger Hamel, "A New Vision of the Future - a Future in which Canada will be Competitive in International as well as Domestic Markets.

Towards that end, the task force on the environment was given a mandate to recommend to the National Chamber, to its 500 branches and its 170,000 members how small and medium-sized businesses can operate in an environmentally sensitive way in their day-to-day affairs.

Our group comprises representatives of business, labour, academe and the environmental community. We have been meeting, and will continue to meet, over the next several months, in different regions of the country to prepare a report for presentation to the National Chamber at its annual meeting in Saint John in September.

Ours is a world of rapid change. Businesses that do not anticipate change, but merely react to it, or, worse still, try to ignore it altogether flounder.

The Task Force I head seeks to help business meet the challenge of change in the environmental area. That challenge is a formidable one. Certainly, it is an area in which government intervention can be expected to increase in the years ahead, despite a strong trend in the opposite direction in most other areas.

The Royal Commission on the economic union and development prospects for Canada (The MacDonald Commission) - hardly a source of wild-eyed environmental militancy - called for more regulation to protect the environment on the grounds a healthy environment is the basis for a sound economy. Governments at all levels appear to be heeding that advice. Not only is the writing on the wall; it's in big, bold letters.

As environmental issues soar on political agendas, and as laws and enforcement get tougher, the role of our task force is: to promote greater private sector involvement in the relevant issues; to communicate the value of environmentally sound business practices; and to recommend a practical guide for responsible corporate behaviour concerning the environment for small and medium-sized businesses, which, in many cases, lack access to such information.

We seek to influence primarily the chamber's membership. But the Task Force also has the potential to make the public at large better aware of the link between a healthy environment and a sound economy. This broader purpose is consistent with the leadership the Chamber of Commerce has always given to local communities and to the country as a whole.

Norway's Prime Minister Gro Harlem Brundtland, who chaired the World Commission on Environment & Development, noted the ambivalence the public has towards business people.

> "You, as industrialists, are often regarded as the prime source of environmental problems, especially pollution. However, you are also the source of comforts, convenient machines, clothes, cars and many basic ingredients of a good life. You are also the source of development and of jobs. You are thus both reviled and appreciated, very often by the same people, although at different times."

Whatever may be the performance of some other companies, the Task Force knows that many have excellent records in the environmental field. Whether by scrupulously complying with environmental laws or by effectively tackling resource management problems, they are helping to protect the environment while in many cases cutting their own energy and other costs. They are doing well by doing good.

Among other diverse practices, our group is keenly interested in recycling. One grocery chain in Quebec, for example, found it could save a great deal of money recycling cardboard. The President of a major metal company has publicly stated that his company's prospects for growth are pinned to plans to recover its products for recycling.

The public is responding enthusiastically to so-called green products now widely available in some stores - products that can be recycled, that are biodegradable, or that respect the ozone layer. Clearly, in these cases, what is good for the environment is also good for business.

Our Task Force is drawing on all such examples as models for the business sector.

There are in Canada some 750,000 small businesses that employ ten people or fewer. In those companies, the owner, the manager, the chief financial officer, the environmental administrator are the same person. He or she needs, and in most cases would welcome, the kind of guidance the Task Force can provide on a wide variety of environmental matters for which the individual must take direct responsibility every day.

Compliance with environmental laws is the most important responsibility of all. But it is not enough for business merely to comply with the letter of the law; it must fully integrate environmental decisions with economic decisions. Does your business conduct environmental audits? Does it have emergency procedures? If so, are they reviewed and updated regularly? Is there an environmental policy mandated by senior executives? Do employees know about it? Are they encouraged to be part of the process? Do operating officers systematically advise the Board of Directors about their environmental responsibilities? And is the public made aware of what you are doing in this area?

Earlier this month, the Prime Minister of Canada challenged business leaders gathered in Washington to develop and practice an environmental ethic. "We will know an environmental ethic is accepted when a company's environmental policy statement is as integral to its yearly report as its financial statement," he said. "We will know that environmental ethic is established when industry leads government in the protection of the environment."

The Chamber's Task Force on the Environment will try to give some precision to the concept of an environmental ethic for business. In doing so, we are not starting from scratch. Instead, the Chamber of Commerce, both nationally and internationally, has done a lot of good work in this area. The International Chamber formulated a set of environmental guidelines for world industry in 1974, and revised them in 1981 and 1986.

The guidelines contain basic principles for industrial operations for relationships both between business and public authorities and between business and society.

A further step was taken by the International Chamber of Commerce in 1986 with the creation of the International Environmental Bureau - a world-wide trans-industry clearing house on environmental management information.

Building on such a foundation, the Canadian Chamber of Commerce Task Force on the Environment welcomes ideas from everyone at this conference on how business can help bring Canada's economy and environment into better harmony.

We seek your help and hope you will find our report useful.

As Chairman of the Task Force, I look forward to the release of our findings for your benefit and for the benefit of all Canadians.

SUSTAINABLE DEVELOPMENT: THE CHALLENGE OF SOCIAL CONSENSUS

Dr. David L. Johnston

Chairman, National Round Table on Environment and Economy
P. O. Box 3413, Station D
Ottawa, Ontario K1P 6L4

Good afternoon ladies and gentlemen, fellow panelists -- thank you for this opportunity to address your Conference in Winnipeg.

As we are all well aware, the environment ranks at the top of personal agendas here in Canada and around the world. The latent public desire for change is enormous. Mobilizing that latent desire in a constructive and sustainable way is one of the major challenges we face as a nation, and as individuals.

Twenty years ago, the environmental movement was considered by many to be a grassroots movement. It challenged our institutions and forced some necessary changes - the kinds of changes institutionalized by the world at the Stockholm Conference in 1972, of which our Chairman today, Maurice Strong, was Secretary General.

Since then, governments have been more heavily involved in environmental issues. We've seen environment departments formed around the world; we've had new laws and regulations; some very promising international protocols and conventions have been signed; and we've seen the United Nations become increasingly involved through the United Nations Environment Program (UNEP) and, of course, the World Commission on Environment and Development (The Brundtland Commission).

The Brundtland Commission has eloquently challenged every nation and every one of us to redress our present course with optimism. That underlying optimism is shared by all of us who have accepted to serve on the National Round Table and, I am sure, by many of you here today.

The task of implementing sustainable development is indeed formidable. There are few if any experts in this field as a result of its newness and its multi-disciplinary demands. So I am grateful for this opportunity to test some of my own ideas here. For the National Round Table, our agenda for the 1990's is not carved in stone, it is preliminary at best. As in all aspects of sustainable development, it is evolving today and every day.

All of our hopes for sustainable development start with a single and unalterable premise: that a broad social consensus on the need for change must be engendered nationally and, ultimately, globally.

So the arguments and trade-offs must be taken directly to those people most affected, the Canadian public. And this must be done in a manner which recognizes the immediate necessity for economic activity and competitiveness, and their widely accepted benefits. The last thing we can afford is a backlash from the public because a crucial component of change is the public's desire for and acceptance.

But these are relatively easy times, if I do say so. The challenge will be to maintain this social consensus and cohesiveness as the options narrow and the price of the necessary trade-offs becomes clear to everyone concerned.

This is one area, that I suggest the National Round Table and the Round Tables in each of the provinces can have great impact. The National Round Table is a place where real life trade-offs can be discussed - openly and realistically - among competing interests. And from these discussions can flow consideration of the range of solutions which fall within the limits tolerable for both the environment and the economy.

I might be accused of being overly optimistic about prospects for the Round Table. However, I don't think this is the case. The Round Table process is in the tradition of Canadian consensus-building. I can think of a number of times when different sectors were brought together to find common ground on important environmental issues:

- Northern Conservation Strategy of 1984;
- National Task Force on Environment and Economy
- National Forestry Strategy of July 1987;
- Energy Options of 1988;
- Pesticides Review Board.

These are all major achievements in consensus-building, a field in which Canadians are becoming world experts. Perhaps it is because, Canada as a nation, has had to become an expert bridge-builder in order to span the different regions, jurisdictions, cleavages and multi-cultural nature of our country.

The National Round Table continues this tradition of consensus-building, but this is all that is traditional about the Round Table. It comprises 25 members - from government, business, finance, science and strategic policy sectors, and non-government and public interest groups.

What we can do is really quite simple. We can use our individual knowledge and connections to build strategic partnerships. We can broaden the base of understanding on specific issues and stimulate the public and decision-makers at all levels to consider the options available to us.

The National Round Table is a multi-disciplinary forum which will hear the kinds of viewpoints and expertise which must be reconciled in order that progress can be made towards sustainable development. In this sense, it can be likened to a crucible in which different values and interests, ideals and ideologies, priorities and social parameters will be joined in what we hope will be a common cause.

The Round Table will also, I hope, be a catalyst. Its members must be prepared to act as well as talk. They must be prepared to carry the Round Table's message back to their own constituencies.

Our new logo, intertwined circles around a round table, symbolizes this notion of extending the partnerships beyond the round tables and back into the sectors from which we have drawn representation.

Principally, the National Round Table will focus on three objectives:

Firstly, to promote new awareness

The National Round Table can be a catalyst for changing attitudes from the boardroom to the living room to the classroom.

We want to promote sound sustainable development values throughout Canadian society based on the facts as we see them. Where there are better ways of doing things - such as adopting environmental codes of ethics - we want to promote those better ways.

Secondly, to create new partnerships

The National Round Table can take this new awareness and work to broaden the partnership of interests required to promote a truly national approach to sustainable development issues.

And thirdly, to promote new institutional practices

Through its activities, the National Round Table can help catalyze change in institutions so that issues of sustainability are central to decision-making processes.

Thus, I'm enthusiastic about the Round Table, and the corresponding Provincial Round Tables. But I am also realistic. We are not going to have all the answers a year from now. We are hoping to make some ripples, ripples that may become waves if we can successfully reach common goals and achieve partnerships between economic and environmental concerns.

Change won't come about without creativity, patience, and hard work. But when I speak about sustainable development and the National Round Table, I often recall one of those quotes one never forgets, from Jim MacNeill, the Secretary General to the Brundtland Commission and now a member of the National Round Table:

"If you change the way you make decisions, you change the decisions that are made."

CHANGING AGENDAS

The agenda I see for the Round Table includes important areas of change. Let me deal with just some of the kinds of change we will be considering and learning to manage:

1. Sustainable Development and Business

In my experience, the management suites and boardrooms of the nation tend to reflect the values of those communities from which their membership is drawn. I think it is fair to say that the families of business leaders, and business leaders themselves, share many of the same environmental concerns as most of us participating in these sessions today.

Business is also having to grapple with some important new concepts. A recent report on economic-environmental accounting by the Rawson Academy put the issue quite succinctly:

"Most economic development theory and policy... has dealt with natural resources only as 'free gifts of nature'. Environmental impacts are conventionally considered 'externalities', and environmental protection is seen as inhibiting to the growth of income."

I know that Round Table members like David Buzzelli of Dow Chemical and Roy Aitken of Inco are keen supporters of sustainable development as most others in this room today.

I also know that business leaders like David and Roy are also worried about "public mistrust" towards business over protection of the environment. When the Round Table meets for its Inaugural Meeting in four weeks, I know that business leaders will almost certainly want to speak to this new challenge to business - the need to adapt to environmental needs while remaining competitive.

The business community will, of course, be looking for a level playing field - the same rules for all the players, in Canada and internationally. This is going to require unprecedented levels of international economic and political co-operation.

And the business community will also be wanting to grapple with some issues fundamental to the way business looks at business itself - issues such as:

- reconciling short-term profit versus long-term environmental soundness,

- developing accounting principles to deal with the full costs of liability when the environment is damaged,

- taking a real look at the range of economic incentives offered business, and whether these incentives reflect the principles of sustainable development.

Business must understand - and the National Round Table can help deliver this message - that poor environmental management is costly; and that good environmental management is good business.

Governments, meanwhile, must strive to find the right balance between regulations and incentives. One of the dangers, in the words of Ian Smyth, President of the Canadian Petroleum Association, is that: "Regulations tend to regulate everyone to the lowest common denominator...Canada has plenty of sticks in its arsenal; it's time to plant more carrots."

2. Sustainable Development and Legal Reform

While governments are only part of the overall solution, a major part of our challenge will be met through the law, both internationally and domestically. International environmental treaties, for example, are clearly necessary to overcome the transnational problem of environmental degradation. International trade rules may also have to be scrutinized to ensure that export sales represent fully allocated costs of production - costs that include environmental costs.

The law represents the crystallized values of society. It is important, therefore, for the legal community to understand how attitudes are changing and also to provide the ideas, the intellectual leadership, for such change.

I have already been witness to several important initiatives, such as:

- the Law Reform Commission is currently concerned with issues of insurance, criminality of polluters, and the renewed challenge of private property versus public interest, and

- the Law and Society Project of the Canadian Institute for Advanced Research (CIAR), in which I am taking part is testing the concept of bringing empirical evidence to the legal system against the reality embodied in the legal system.

3. Sustainable Development and Education

This is another very broad topic. Let me deal with just one important aspect, the school curriculum.

My very own simplified, and as yet untested formula for a sustainable development curriculum in education is, one-half science and technology and one-half ethics.

It will not be sufficient in the long-run to teach the 'how-to' of environmental consciousness, as if it was a memorized recipe. We must also teach the 'why' and the 'who', in other words, the need and for such consciousness and the individual responsibility.

As in society, so it is in schools that scientific evidence must play a dominant role in influencing and subsequently determining behaviour. A strong scientific culture is needed to balance the understanding of environmental threats and the effectiveness of technological solutions.

This spills over into society. Take for a moment the new controls on CFC's; these would have taken longer to negotiate if
scientists had not discovered the hole in the Arctic ozone. Less successful to date has been acid rain containment, where conclusive evidence has been more difficult to establish.

Ethics of course, deals with values and behaviour. Ethics teach us that, one can make a difference and that participation, both individually and collectively, can be both powerful and reinforcing.

If I had a dream for the next generation of school children, it would perhaps be something very simple and yet, symbolic. Simply put, that each child would start the new school year by planting a tree.

I am influenced in this symbolism by an ancient quote from the Book of Proverbs: Blessed is the man who plants a tree knowing he will not be there to enjoy its shade.

Indeed, we are entering into new and as yet, uncharted waters. We are being challenged by Dr. Brundtland and others to examine these vital issues in terms, which are truly societal. The agenda for sustainable development is very ambitious and very wide-ranging.

In fact, nowhere does there exist the kind of fundamental challenges to our current institutions and present way of life, indeed, our way of perceiving ourselves, that sustainable development now demands.

The task of the National Round Table is to change the priorities involved in economic and environmental decision-making so that neither is considered in isolation by businesses, governments, and each one of us in our day-to-day decision-making.

And this must be done, ladies and gentlemen, within that broadly accepted social consensus of which the concept of Canada, as a nation and a people, is based.

Thank you very much for the opportunity to be here today.

CHAIRMAN'S SUMMARY AND OBSERVATIONS

Maurice Strong

Chairman, Strovest Holding Inc.
Suite 100, 72 Chamberline Avenue
Ottawa, Ontario K1S 1V7

Now I am supposed to provide something of a brief summary. I will not attempt to do that. It is pretty hard to be chairing a session and write a summary of what you heard. I will, however, make a few closing observations that borrow very heavily on the dialogue we have had this afternoon.

I am always interested in the debate on: What is Sustainable Development?; I participate in it; I agree with those who say it is important that we continue this; but, it's also important that we define it in our commitment to action as much as in our dialogue. I think Sustainable Development as a concept, is fairly easy to understand and I often find it's easy to explain it in terms of putting the planet Earth on a business-like basis as if it were a corporation. After all, any businessman knows, any farmer knows that you cannot run a business or a farm if you are running down the basic asset on which the business is based. For example, if you are not keeping the soil up to par, you are not going to be able to extract your livelihood from it for very long. Or if you are not running a depreciation and amortization account in your business, renewing it's capital facilities etc, keeping them up to scratch you're not going to be in business very long.

All the Brundtland Commission is saying is that Earth Incorporated has not been running a depreciation and amortization account. It simply says, we've been living off our capital and we can not continue to do that on a planetary basis any more than we can on an individual basis or a firm basis. Planet Earth is in fact headed for bankruptcy. It was very important that Thomas D'Aquino, who is the leading Ambassador of the Business Community here, would be the one who would identify the fact that we are talking about survival. We are really talking about something profound, not just another fad, we are talking about the real threats that exist to the survival of life on Earth. Now, that may sound like gilding the Lily, but it is not.

I've been very fortunate for many years to be exposed to experts and to experiences which have certainly moved me to the point where people say, "Why are you doing this kind of thing at your age of life?" Well, I believe that it is the most important thing in the world. I do believe that on this little planet of ours, the parameters that make life possible are in danger. They are in danger from an immense acceleration in human impacts which comes, first of all, from the growth in human numbers, but also from the growing intensity of human activity.

While we have tripled the planet's population since the turn of the century, we have increased industrial activity by a factor of 50. In other words, the acceleration of human impacts on the planet has far outstretched the simple increase in population and we are literally at the point where the future is in our hands. I am one who is persuaded, not that the end of the world is going to come tomorrow, but the things we do or fail to do tomorrow, today, are really going to shape our final destiny. In that sense, I do not think we have much time. I think we really do have to make that shift, we really do have to make that transition and we have to start making it now.

I am also one who says that rhetoric is great. Some of we environmentalists have been in dismay for years that politicians were not mentioning the subject--so we are encouraged when political leaders, our own Prime Minister, Prime Minister Thatcher, and President Bush when he says, "I am an environmentalist" and says it proudly, I am very happy. I agree with Tom McMillan that this is progress. I'm sure he would have been happy every time the Prime Minister mentions sustainable development. That helps the cause. It helps his Minister, it helps the cause now, so do not knock the rhetoric.

The other thing about rhetoric; when politicians stake out their claims and make their commitments, sure they have not lived up to them all, they cannot do so overnight, but they are setting high standards by which we can judge them, and that is very important. Let us take them seriously. I am partial to giving compliments. I like to compliment political leaders when they are making promising statements, because I like to feel that this is part of the process of holding them to their statements. I hope that we are going to do that.

We have also heard about the poverty in the Third World. I spent a lot of my life in the Third World. I am glad that you have got Ken Piddington from the World Bank. He is in charge of the Environmental Programme at the World Bank, which has become one of the most important influences on the whole development process in the developing world. You also have Hugh Faulkner coming from the International Chamber of Commerce. Now our own Canadian Secretary-General of the International Chamber of Commerce. This is not just your Local Chamber or your National Chamber, but the International Chamber. The International Chamber has been in on this from the time of the Stockholm Conference. So that's an example of early business leadership. See you've got a lot of people who are coming on to your program that are going to be able to deal at large on the themes that we have laid out here today. But in the Third World, Environment issues are associated with poverty and the perpetuation of poverty is the greatest threat to the Environment. The vicious circle. In the industrialized world, environmental impact is associated with wealth, because it is the very process by which we have created our wealth that also, in ways that we did not originally envisage, has been our downfall. We have lost our innocence, we are now aware of these problems and we know that through the process of wealth creation we have been not only creating dangers to human life, but also undermining the very basis for the continuance of economic activity.

No-growth is not a philosophy that any government will promulgate, but no growth will be the result of the continuation of our present destructive growth practices which is why we are talking about moving to sustainable development. Premier Filmon called it, "An adjustment process". Well, yes it is a transition and we are in the midst of that transition now. I believe we can make it, because the bad news of the Brundtland Commission is that we cannot continue our present course. We are heading for bankruptcy and disaster. Our survival is at risk if we continue our present course. The good news is that it is still possible to change. It will be tough, it will be difficult, we cannot do it with rhetoric alone. But it is still possible and every moment we fail to take it seriously, to translate rhetoric into action, is a moment that the clock is ticking against us.

We also heard, and it was appropriate that we had the Right Honourable Joe Clark to remind us, of the international dimensions of this as a systemic world. We are realizing that it is in our economic life. Anyone who looks at the stock market or the grain prices is looking at what happened in Tokyo or in Australia or in Brazil in terms of some of our commodities; what happened weather-wise in those places, what happened in the opening of the stock market in London--it is also true pollution-wise. Mother's milk in central Africa will not meet U.S. Health standards.

This is a systemic world and we cannot be parochial. Even the most local products or issues have got to be dealt with in a global and systemic dimension. The cause and effect system by which our future is being shaped is clearly global in scale and systemic in nature. Everything is literally related to everything else. Now, of course, business is at the heart of it all. It is largely through our economic activities that we impact on the environment. That is the source. But it is not just businesses. We who are their customers, who earn our living from them, governments who get their taxations from them, we are all in it. Businesses are simply the instrumentality through which we have all been putting exploitative practices first.

We have got to move from extracting value as we have done in Canada for much of our economic growth to adding value. That is what sustainable development is, it is really adding value by the application of human knowledge through design, through marketing, through management. For example the economic value of a painting - you are seeing an explosion in art values today. That is good. I mean, when someone writes out a cheque for $5 million for a "Picasso", that is economic growth, that is added value. When someone buys a video tape, when someone buys an audio tape that is the kind of added value that causes explosive growth in economic terms with minimal material and energy inputs or effects on environment. Sometimes, of course, when those tapes are turned up loud it might create the kind of output that we do not appreciate.

We have got to form an alliance. The theme of this conference is, "Partnership". It is not just a partnership between levels of government as reflected here when I was pleased to see Mr. Filmon and Mr. Clark sitting side by side. That partnership is absolutely essential: the Federal and Provincial levels. But the larger partnership, the partnership of the people represented in this room--the business leaders, the consultants, the technical people, the environmentalists, the farmers. I feel it would be good if that partnership were evenly and widely represented in our conference. I hope we will all bring that message out to our various constituencies, because this a continuing process.

In my own experience, it is not easy to be identified with these issues. Especially, since I am a businessman and an environmentalist. I get flack from both sides. So when I say it is going to be tough, it is going to be tough.

I am very active in organic farming and recently the organic farmers of America were attacked by a leading Agricultural organization as a danger to the economy. I am not an extremist in the sense that I happen to believe that God made human ingenuity and the ability of human ingenuity, and we can take the best of organic practices and marry them with some of the things that maybe the purist may not accept. But nevertheless, I believe we have a lot to learn from the organic movement. Yet that is a problem.

I am involved in a water project in Colorado. It is very controversial. We didn't go in there for water. We bought a huge ranch in a lovely valley in Colorado and later found there was water under it. Under Colorado Law, when you find that there is water under property, you either put it to use or anyone else can come in and do that. I'm taking a lot of flack. People are saying, "How can you be an environmentalist and still be developing water, when other people are concerned that maybe that will affect them." Well, that is not easy, it would be much simpler to leave it to somebody else and let them take the flack. But I just happen to believe that if we are really going to champion Sustainable Development, we have to be willing to get ourselves into some difficult situations and believe me we are all going to find ourselves in difficult situations. It may sound easy, it may sound polite, when we are all agreeing around the table here or generally agreeing. But there are going to be very, very tough trade-offs.

For example, the extractive industries, some say you cannot turn a mining company into a sustainable operation as it is going to disappear. I mean there are some operations, by their nature, that are not sustainable in themselves. But what you do with them, where do they fit in the sustainable development picture; they fit in the sense that they are precious non renewable resources. So, surely, some of the economic benefit that comes from those needs to be fed into the whole system by which the rest of the society is sustainable.

Sustainability does not mean that every single little action will in itself be sustainable on a self-contained basis, because it does not work that way. It means that the Planet as a whole and our individual societies have to do that. Therefore, it is not going to relieve us of the tough trade-offs. Not every industry can become sustainable by simply deciding to do so. What I believe and I hope is that the International, the National, and Provincial Round Tables will challenge every sector of Canadian life to develop their sustainability balance sheet and to develop their agenda for all people in all the sectors. Farmers know better what to do in their own sector and businessman in each of their sectors of life. They know better how to apply sustainability criteria to their own business and in the course of doing so, they will learn a number of things. If they are given leadership and incentive, they can do an evaluation of their industry and their company.

They can be challenged to that. They will see some things they can do and make money at them. I met with the Head of an Ammonia Plant in Brandon. He said that they had decided to take up the challenge. They looked at their operations and they were surprised how many things they found they could do that reduced their environmental impacts and at the same time were profitable. But they also found certain things that they could not do without changes in policy, regulation, or fiscal incentives.

That also is important because when an industry goes and takes a deep look at itself and says: "Yes, in this respect we cannot do this on our own without a change in the regulatory system." Then the public, through the Government, has to make some changes. They have to decide, do we want it badly enough to give them the kind of incentive to manipulate the system in order to make it desirable and profitable for them to work.

Let me say a word about Japan. I just got back from Japan. They haven't announced any world centres on sustainable development, but they are quietly establishing one and I am impressed at the high level of their interest. The Prime Minister, top Heads of Mitsibushi and Mitsui and others were asking me to help them set up an International Board for their Centre. Yet, they have not even announced it, but they aren't very far on it. Why? Consider their experience. Let me quickly relate that experience. At the time of the Stockholm Conference, when the Swedes first decided to introduce a resolution to the General Assembly to hold the Stockholm Conference, the Japanese Ambassador got up and said: "Well, this is not an appropriate subject for an International Conference. This may be a problem for some, but it is no problem for us."

Then came Minamata and a whole explosion of environmental awareness in Japan. The Japanese did what they do well, they said they would look at this thing again. They consulted with their citizens, with their scientists, with their business leaders; finally they came out with the toughest pollution control regulations anywhere and the most generous incentives to their industries. What has happened is that they have dramatically lowered pollution levels in their major cities, particularly Tokyo. They haven't got all environment virtue, I assure you, but they have dramatically lowered pollution levels and at the same time, they have won a new generation of comparative advantages for Japan. They are leaders in the new industrial processes that are kind to the environment. They now see sustainable development as the wave of the future. They have reduced the energy and the materials content of a unit of industrial production in one period of 11 years (1972 - 1983), under the impetus of potential shortages, by some 40 percent. They have done this during a period of growth, when they led the world in growth. They demonstrated that high rates of growth are in fact compatible with environmental sensitivity. Their industrial leaders tell me now, they believe this is the wave of the future--economically, not just environmentally. So, we need to understand that for us, too, this is not only a possibility but a necessity.

I am very pleased that note has been struck on several occasions here in our dialogue on the need for practical action. We do have to move the sustainable development dialogue down to the level of implementation. We have to become operational. That doesn't mean that we want our political leaders to forget about it. I hope they will continue to include it in their rhetoric for the more they do the more we can hold them to performance on that. We need it at every level. We need it at the level of governments, and as I think Tom McMillan made very clear, Governments first have to talk about something. That is the beginning of the process of doing it. You don't do these things instantly.

Energy is one of the fields. The Brundtland Commission made it very clear that there is at the moment no environmentally sound, economically viable energy pathway to the future. Cold fusion, maybe? But even if it is so, it is going to take a long time to be translated into a usable substitute for the major fuels. Nuclear Scientists believe we might have to take a new look at Nuclear. I am cautious on that, but there is a lot of opinion on the need for it during this transitional period. Oil, gas and coal - the fossil fuels. Coal is the biggest sinner. Coal is the biggest potential source of future energy for some of the major developing countries like China. Do we tell them they cannot develop their coal, because it may affect the climate for all of us? We have to offer them some reasonable viable alternatives if we want their support. They are going to say to us: "Look, you Canadians use twice as much energy now as even the Europeans per capita and per unit of production." Not exactly 50 percent, but it is something like that. Wouldn't it be fair too, for the Brazilians to join in saying to us: "When you are ready to reduce your contribution to our world pollution problems then you can start to tell us what to do." Well we have to help them. We have to create working partnerships. We have to make the world's system work for them too; if we are going to share, with them, its risks, and share responsibility for avoiding those risks. They have got to be brought into it as full partners.

Water is looming as one of the major issues in the world agenda and on the agenda of the Prairie Provinces. I am very glad it is high on Manitoba's agenda. Small shifts in climate of the kind we may well be experiencing now, can make a horrendous difference to the productivity of the Great Plains area, where the rainfall levels and small shifts in the patterns of rainfall can make an immense difference. I saw a study by the University of Colorado recently. It said that there is a very real risk of the moisture level in the Great Plains area of Canada and the U.S. being reduced by 50 percent. That is speculation; it is not a final scientific verdict. But it does indicate the scale of the risk that we face.

It really does get down to motivation. Motivation in the final analysis, is the product of our values and our culture. Those values: ethical, moral and spiritual. We know that people act in relation to their motivations. Also related to that is inertia. In my view, inertia - the tendency to keep doing things the way we've been doing them - is probably the most powerful single factor in human affairs. We have to break that inertia and it will be painful. Many people have an interest in the status quo and some of us have a greater interest than we realize. We should do a good analysis of where our interests lay. To make this transition, we must move. For me this means the oil business too. We are going to have to move away from the fossil fuel economy. We are going to have to move away from coal. Oil is better, but still not good enough. Natural gas is best in terms of the fossil fuel mix. We are going to have to rely on fossil fuels and on natural gas and oil for some time during this transition. So we have got to use less of it. We have got to use it more efficiently. Conservation is still the most cost effective way of reducing the pollution.

Finally is the question of knowledge. I am glad we have been reminded several times that knowledge is the key. Information, openness, and the willingness to put the data on the table to give the consumers the information necessary to guide their choices. This is the essence of the democratic process. I believe that the imperatives of sustainable development are forcing a more democratic and open process, and that knowledge and the ability to manage knowledge and to understand how to use it, is the best weapon we have.

Final Remarks

Stewardship, equality, justice. Without these values, everything else we are talking about is not likely to be more than the froth on the beer.

Thank you all.

I wish I were going to be here for the rest of this conference. I hope that you are going to move from this session this afternoon to an even more intensive focus on what to do and how to do it and how each of us can play an important part in the process. Not only of broadening the circle in terms of getting the message out. But broadening the circle in which people take a hard look at where they stand and what they are doing affects the future of our planet. Because after all, it is at the level of the individual that we will experience the risks to ourselves and our children. It is at the level of the individual that we are going to decide and to act to ensure that those risks do not materialize.

Thank you.

TITLE: Keynote Speaker
SESSION: Thursday Morning
BULLETIN NO.: 3

HUGH FAULKNER, Secretary General of the International Chamber of Commerce, spoke of the role of international business in meeting the challenge of sustainable development. "There is a distinctly new mood about," he said, "and in my opinion, a new degree of consensus." He based this observation on the fact that in the past, only 10 ministers on the environment made presentations at UNEP conferences compared to the 50 ministers this year.

Global warming, depletion of the ozone layer, dumping of toxic wastes and environmental disasters such as the Exxon Valdez oil spill, are the reasons for a new political dynamic behind the environmental issue, he said. "Industry must recognize this political force, respect their concerns and form a partnership with their critics," said Faulkner.

Sustainable development is a radically new concept to business and governments, he said, and will require a conceptual leap. "The challenge of sustainable development is to understand the adjustments we have to make in the traditional way of doing things," he said. "We need to develop a common agenda, a common framework, and common arithmetic."

He spoke of governments becoming more vigorous and demanding. We can expect: more regulatory control, such as the banning of aerosol sprays; the introduction of pollution taxes, such as the 30 per cent levy on non-returnable bottles in Norway; and, on the positive side, incentives to support the move to clean technologies.

Defining clean technology as any technical measure to reduce or eliminate the production of pollution or waste at the source (filters, scrubbers, treatment plants, incinerators) would accrue cost savings while improving the working environment. Unfortunately, said Faulkner, the way we make investment decisions mitigates against clean technology. "Industry sectors experiencing low growth are not likely to invest in clean technologies and they are often the worst polluters," he said.

"With the depreciation of capital assets, it may not pay to replace a piece of equipment that has been written off," he said, "and perversely, it's a lot easier to get a standard waste treatment plant approved than to get support for a new piece of clean technology."

He suggested that free market forces are unlikely to lead to a rapid dissemination of clean technologies, particularly in the developing world. The onus is on regulatory regimes to re-examine the effect they are having on the rate of technical innovation, he said.

Faulkner spoke of the role of transnational corporations in the Third World. "Although some have positively bad records, some have superb records," he said. "But more importantly, we can do more and we can do better."

Addressing the issue of global climate change, he stressed that the situation was both real and urgent. Moreover, he said that in spite of the complex scientific uncertainty, it is no excuse for inaction. "It affects all business, and industry must become involved in turning it around," said Faulkner. "We're the authors of the problem and we must become the authors of the solution."

He stressed the need to conserve energy, especially fossil fuel energy, and to do it immediately. "Japan's energy input per unit of GNP has fallen steadily over the past 10 years due to fiscal incentives," said Faulkner, "while jet engines are 50 per cent more fuel efficient than they were 20 years ago."

Faulkner's final comments dealt with nuclear energy. "It is unrealistic to talk about containing carbon dioxide or reducing it without talking about nuclear," he said. "People who talk about sustainable development have got to come to grips with nuclear and its role."

ISSUES RAISED FROM THE FLOOR

. How can you suggest that nuclear energy is the answer? What about alternative energy sources such as solar and wind power or more emphasis on conservation and improved efficiency?
. What is your stand on genetic engineering?
. Global consensus is impossible. We must pick our issues and pursue the possible.

HOW SHOULD INTERNATIONAL BUSINESS MANAGEMENT RESPOND TO THE CHALLENGE OF SUSTAINABLE DEVELOPMENT

The Honourable J. Hugh Faulkner, P. C.

Secretary General, International Chamber of Commerce
38 Cours Albert 1er
Paris 75008, France

Thank you Mr. Chairman. Ladies and Gentlemen. I am delighted to be here. My route here was not direct. I was in Nairobi on Tuesday speaking to the United Nations Environmental Programme Governing Council and have been sort of moving for the past twenty-four hours. My voice is a little hoarse. My mind is marginally less alert, whatever that means. I have too many friends in here to elaborate much on that point. This event is a very important event and I don't normally, given the quality of my speeches, travel twenty-two hours to give them. I was delighted to actually meet a number of old friends last night and this morning. It is also difficult for me to give a speech on a theme like sustainable development with Andy Russell in the audience. If there is anyone who understands that concept, who lives that concept, who has it sort of seared in his soul, part of his genetic makeup, it is Andy Russell. He is sitting in the front row. He has promised not to do anything rash during the course of this speech but will have some comments to make at the conclusion. We have had a number of very good times together in Alberta, particularly in the mountains. In fact, I think we even had the distinction, after a long trip up the mountains, coming down to the Waterton Hotel and being refused a drink and Andy trying to explain that this man is the Secretary of State. They didn't believe a word of it. In those days being a Liberal was enough reason for not being served a drink.

In any event ladies and gentlemen this is described as a keynote speech. I would prefer to look at it more as the reflections of someone who has had some rather remarkable opportunities in public life in Canada; recently running a large company in India for three and a half years which included amongst its operations Bauxite Mines, Chemical Plants, Smelters, Rolling Mills; and also very recently, in Europe.

I have some themes I want to develop and some points I want to make. Before I do that I just want to tell you about Nairobi. There is not much to tell you except that my impression of the UNEP Governing Council is that there is a distinctly new mood present. For instance, traditionally at these meetings there are ten Ministers of the Environment. For this meeting there were over 30 Ministers. They are making an appeal for something like $100 million, - up from the current level of $40 million. That is just 20 percent of what Michael Miliken, a junk bond dealer, was able to make in 1987. Therefore, it can't be an unusual budgetary request. There is a cynical view there that it could be all show and no dough ultimately. My impression is that there is, at the political level, a new degree of concensus and it is a concensus that goes beyond simply developing countries and developed.

I want to start by talking about the context, particularly from a business perspective. Global warming, the depletion of the Ozone Layer, dumping of toxic wastes, environmental disasters like Exxon Valdez and importantly the greening of Thatcher and Gorbachev has introduced in my view a new political dynamic in this equation. It is a dynamic which is bound to lead to far more action than we have seen in this area to date. In France, it is interesting that the Department of Environment now reports to the Prime Minister and the chap that acts as the intermediary between the Department and the Prime Minister is a fellow by the name of Brice Lalonde. He was, a few years ago, the Green candidate for the President of the Republic. He has now moved into the mainstream of bureaucratic/governmental action. The European Environmental Bureau, which is a coalition of something like a hundred and twenty organizations, has twenty million members today; Denmark has more members in its environment groups than it has population. The explanation is that they belong to more than one. There are something like 127 elected Green Members of Parliament amongst nine countries and the EEC. The market is beginning to show and manifest the notion of green consumers. The green consumer guide has been on the best seller list in the U.K. now for quite some time. The conclusion I would draw, from a business perspective, is that industry must recognize this new political force, we must respect the concern that lies at the root of it, and most importantly we have to work with our critics.

I think we also have to understand there are in this area enormous new costs and risks. It is interesting that the Dutch Government, which arguably is the leading European Country in terms of concern about the environment, has a national environmental plan which is broadly approved by everyone across political parties, broadly supported in the population. Its aim is 70 percent reduction in pollution, the projected costs are $3.4 billion by 1994. And around the financing of that $3.4 billion, the government fell two weeks ago. What we have to understand is the context, political action is going to be extremely difficult and the costs are going to be substantially higher than most of us are prepared to admit.

Sustainable development. There is no agreed definition of sustainable development. Sylvia Sutherland who is with us today, Mayor of Peterborough, this morning gave me what I thought was an interesting definition, "Intergenerational Equity". Brundtland, in her report talks about meeting the needs of the present without compromising the ability of future generations to meet their own needs. Or, in that same report, there is this quote, "A process of change in which the exploitation of resources, the direction of investments, the orientation of technological developments, and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations."

Both those will generate debate. It seems to me that the concept, the fundamental concept behind sustainable development is clear: it means integrating ecology and economics; it means twinning environment and economics; it means doing that at the political level and it means doing it at the corporate level and it means doing it at the municipal level and that ladies and gentlemen is a radically new concept. It is a radically new concept for both government and business. We have always handled those issues separately. Environment has always been a marginal variable depending upon the direction of the company, the sort of commitment it has and the intent of governments. It was a marginal variable. Sustainable development means environment has become or must become a core value and that raises some issues I want to talk about.

Before doing that, just let me refer to two companies which seem to be moving in this direction. I have here a speech that Dr. Alex Krauer, whom some of you may know, who is the managing director of Ciba-Geigy and is also the Vice-Chairman of the International Environmental Bureau which is a specialized division of the ICC of which I am the Secretary-General.

This is a speech he gave a month or so ago and he says this, "A business can only survive today and in the future if it gives equal rank to the objectives of innovative products and profitability on the one hand and environmental protection and safety on the other. Only in this way can the common concern of society and industry be met effectively." The new C.E.O. of DuPont, in announcing what I would regard as a rather ambitious, impressive environmental commitment very recently committed DuPont to cutting by 70 percent, the amount of hazardous waste produced by all its factories, over the next two years. Equally interesting, and I will get to this point a little later, he has also committed the company to set aside one thousand square miles of land around its plants as ecological refuges for plants and wildlife. Those are companies that are in the lead. There are others. Sustainable development, I think we have to be clear, is for us in business, a conceptual leap, I was going to say Mr. Chairman a leap of faith but I understand that has already been used in another context. If you ask a Minister of Finance to define sustainable development, he will talk to you about real GNP growth, stable exchange rates, low levels of inflation. That is the perspective of most Minister's of Finance.

If you ask a C.E.O. or a Chief Financial Officer what does sustainable development mean for the corporation, he will talk very much, usually in terms of lower cost, higher earnings, increasing return on equity, and depending on the consultants they use in the firm, something about market shares. The challenge posed by sustainable development is not to reject those concepts because that's not on. It's to understand the adjustments we have to make in those traditional perceptions and traditional ways of doing things and how we factor the environment into that play. It is to develop a common agenda, a common framework, common arithmetic between business and the environment. Fundamentally it means a change in our thinking. For business it clearly means evaluating capital projects on a much longer term basis than we have traditionally. It may mean that the discounted cash flow is the environment's greatest enemy. It certainly involves new concepts of cost. It is not realistic to talk about sustainable development and still talk about free air and free water. These are costs of the future.

Let's take a look at, and accountants in the audience may want to reflect on this, whether our current general accounting practices are in tune with the concept of sustainable development. As our assets and liabilities are viewed in traditional accounting terms, are they still compatible with the concept of sustainable development?

Even if we can get around these concepts all of us in business are confronted, particularly in North America (I think it is less true in Europe and in Japan), with institutional investors and shareholders whose main pre-occupation is the quarterly results on return on equity. This is an entirely forgivable sin, but the fact is it is not a concept compatible with sustainable development. Even if in a country one can get institutional investors, shareholders, and businessmen alike to realize what these concepts mean for a business, in a world where 30 or 40 or 50 percent of your product is traded abroad, unless you get this thing happening globally or at least certainly within the context of the OECD, for countries like Canada you will no longer have a level playing field.

Let me turn to what we in business can expect from government. I think it is at least clear to me that government is going to be more vigorous and more demanding in three ways. First of all in the regulatory area. I mean we have seen the banning of the aerosol spray can. I am not sure whether it was the government or Prince Charles' comments on it that had the most effect on the marketplace, but you will see more of that. Let's take a look at the most important area of regulatory activity in recent years - that concerning the CFC's and the threat they pose to the ozone layer.

It was in September 1987, about 20 months ago, 41 ministers and senior officials reluctantly, under pressure, I don't want to exaggerate, but I think fair to say reluctantly under pressure, agreed to a 50 percent cut in CFC's by 1998. Two years later, 81 ministers and senior officials enthusiastically adopted a total ban by the year 2000. The issue merits that degree of urgency. All that I am trying to say to you ladies and gentlemen is see it as a forerunner of the sort of regulatory pace that I think we can expect in business on particularly the sensitive environmental issues. The CFC's are instructive in another way. They have been floating around something like 50 years and they were viewed in the beginning, and the view wasn't misplaced, as a miraculous substance. The sort of thing companies like DuPont search for inert, stable, non-flammable, non-toxic, inexpensive, easy to store a marvellous invention until it hits the stratosphere. It is only when it hits the stratosphere and the UV-C's start breaking those chemical bonds that CFC's become a threat to the environment. The question that one might ask today is whether there are other CFC equivalents floating around whose effect on the atmosphere we are still not certain about. The second thing we can expect from government, with absolute certainty, are pollution taxes.

Today on the Rhine there are effluent charges over certain limits. Non-returnable bottles in Norway capture a 30 percent levy. The EEC is today talking about what it describes euphemistically as an energy tax, it is a carbon dioxide emission tax and the paper which is being debated in the EEC today and has a reasonable prospect of being approved, is talking about a five cent per kilowatt hour of fossil fuel. Something like that would generate $55 billion - paid largely by the U.K., Germany and France.

Pollution taxes are in the cards for business and business' response should be to deal with the issue before it has to pay the tax. Some companies are doing that. On a more positive note, you can expect government incentives to support a move to clean technologies. It is interesting to note existing pollution technologies have offered enormous business opportunities for a number of countries. 60

percent of the anti-pollution equipment that Japan makes today is exported. 3-M, a company which is arguably a leader in this field, some years ago developed the rather interesting formula, "pollution & technology = new resources and profit". Most of the businessmen and women in this room would be familiar with that. What is interesting about it is that 3M, by looking at its processes, looking at its equipment, looking at its products, has managed to save, since 1979, something like $300 million.

I want to take a look, if I may, for a moment at clean technologies because I think for those of us interested in sustainable development there is not a concept more central to sustainable development than the notion of clean technologies, and they are not moving. Amongst the wealthiest countries of the world, the OECD countries, today, only 20 percent of the money going into anti-pollution equipment is going into clean technologies. Why is this? As we move from the rhetoric to action, we find some obstacles. Well, the first one is fairly obvious. Those industry sectors experiencing low growth, static capital investment are not likely to invest in clean technologies, yet it is these very sectors that are some of the worst polluters. Our system of depreciation dictates that a totally written-off plant is unlikely to be replaced by an expensive piece of capital equipment unless it is highly profitable. The way we make investment decisions, (what I said earlier about the discounted cash flow) militates against probably clean technologies. Perversely, the whole regulatory system works against clean technologies. It is a lot easier to get a standard incinerator approved, to get a standard filter approved, to get a standard waste treatment process approved than to come before a regulatory authority and talk about a piece of new untried clean technology.

There you run against the bureaucracy; there are all sorts of questions raised. Therefore, I conclude on this central piece of the sustainable development thrust. Free market forces, (and I am a strong supporter of free market forces) are unlikely to lead to rapid dissemination of clean technology, particularly to the Third World. Governments and industry are going to have to understand, what do we need to do in terms of incentives and other things to make this jump. Secondly, clean technologies on their own are not going to move to the Third World and therefore talk about leapfrogging existing technologies which are part and parcel of the problem is pie in the sky unless government and industry are prepared to invest co-operatively in moving those technologies into the Third World. Thirdly, I would say regulatory regimes should re-examine the effect they are having on the rate of technical innovation. There is a marvelous quote from the OECD. It goes like this, "The less the regulations concern themselves with technology, the more they facilitate technical change." Regulatory authorities should bear that in mind.

Mr. Chairman, I want to touch on two more subjects. First of all, because I spent some time in India, I want to just talk about, for a few minutes, the role of international corporations in the Third World. I think we have to understand that sustainable development is not a subject that is self-evident to people in the Third World.

Andy Russell and I were talking earlier about the level of illiteracy when it comes to environmental questions, even in the developed world, amongst Ministers of the Environment, heads of corporations and the rest. Well if the illiteracy level is low in the developed world, it is substantially lower in the developing world. Therefore, we have to understand that the process of change is going to come through a thousand small steps. To set the stage for the broader questions that are going to have to be addressed, if we are seriously going to do something about carbon dioxide and CFC's. Multinationals have an important role to play. We have to recognize that we don't have a tremendous reputation in the Third World. We are viewed generally, as pillagers or worse. Events like Bophal don't help. We have to recognize that some transnational corporations have positively bad records in the Third World. There are some who have superb records and I was proud to be with a company which has a superb record in the Third World. The fact remains that whether the record is good or bad at the company level, transnationals can do more and can do better in the Third World and it should be a strategy of a thousand single steps if you like. We have to realize that in the Third World, regulatory agencies rarely are able to do much about things - understaffed, lacking technical resources, lacking trained manpower.

Therefore, the temptation to have double standards - something in Manitoba, something else in Ghana, is real. We have to resist that because it is transparent. What can we do more and better, that is simple and not terribly costly. Diffuse our standard technologies, our best practices - we have to start somewhere - waste treatment, recycling. We do it through the International Environmental Bureau today. We can do it individually as companies. Diffuse the management practices that make those things work: Introduce the concept of plant audits: Undertake training programmes: In India, with the co-operation of the Canadian Public Health Association, Alcan has set up the first Occupational Health Centre in the Private Sector. We did it for our own workers, but we built into that centre, which is in the State of Kerala, an outreach programme so smaller companies which couldn't afford it could come and learn what occupational health really meant and how one treats workers. It didn't cost us much. We could easily afford it. Thousands of companies could do the same thing.

If you are going to operate through a decentralized way, watch and pay particular attention to problems of staffing, management systems, and training. Don't assume that they are going to follow the practice of the developed part of the world. In other words, take a leaf out of DuPont's tradition about safety. Look how DuPont has made safety part of the culture of that company whether it is in Willingdom, Delaware or whether it is in India. Contribute beyond what you would normally be expected to do. In a small village outside one of our smelters the management put in a small dam in a local village. It cost us $25 thousand. It captured the monsoon rains. It allowed them to get three crops. It increased by 300 percent the net income of that village. It cost us $25 thousand and some management time.

Last year Alcan earned $900 Million. All of us could do much more and each one of those individual steps are part and parcel of bridging the gap, the credibility, the absence of trust, the absence of understanding between the developed and developing world. Mr. Chairman, just one other subject - the issue - industry internationally has to come to grips with the issue of climatic change. Two weeks ago I was in Washington. At the end of the National Academy of Science meeting their report to us, a group of businessmen, was absolutely clear. Greenhouse gases are causing climate change. It's real. It's urgent. The absence of scientific certainty does not justify inaction.

Industry is involved for three reasons. The buildup of carbon dioxide, and remember the number, 5 billion tons a year, 5 billion tons a year is what we are putting into the atmosphere today. The buildup carries on and it takes on the dimensions of a super-tanker, damn difficult to change its course.

It builds up a momentum the consequences of which are not entirely clear. Therefore, prudent people try to deal with it early. Secondly, it affects every business. It's not just the utilities, it's every business. And thirdly, on a more positive note, dealing with it is an opportunity for business. The problem is enormous because today the plan in China is to double the use of coal by the year 2000 and in India the plan is to triple the use of coal by the year 2000. If we expect the Indians and the Chinese to change this plan, we've got to offer them something more than homilies, rhetoric, and pious exhortations because they know that if there is a problem today, it wasn't created by them. If there is a problem today, it was created by us.

What can we do in business immediately? Obviously energy conservation and anyone in the energy business, whether it's the petroleum business, the mining business, knows what sort of potential there is in energy conservation. The numbers are impressive. 25 percent, 30 percent are numbers easily floated around by Shell Petroleum and they know what can be done. They are leaders. In Japan energy input per unit of GNP has fallen steadily for the last ten years so it is not an unreasonable task. Energy conservation is something we can really do immediately.

Support reforestation. It sounds not to be terribly important but it is when DuPont comes out and talks about a thousand square miles of land around their plants. DuPont can't be the only company in the world which has a lot of land around their plants. In India Alcan will plant 5 million trees over 5 years in our used bauxite mines. That's one company, 5 million trees are not bad! What if everyone did the same sort of thing?

Finally, on global warming, the lead has to come from us. We are the authors of the problem: we have to become the authors of the solution.

Let me just raise, though, two difficult questions. I really leave this for this group to think about. I think it is unrealistic to talk about stabilizing carbon dioxide emissions, let alone reducing them, unless one reopens the nuclear question. A difficult note, for some a jarring note, but having thought about it without any particular bias it seems to me to be a self evident proposition. People who talk about sustainable development, people who talk about reducing carbon dioxide emissions have got to come to grips with nuclear and its role.

Secondly, the Third World, with $1.2 trillion worth of debt. Interest payments last year of $44 billion, per capita income of $200 per annum, it cannot be business as usual with them in terms of technology transfer and capital transfer. With any realistic expectation of results, new formulas are going to have to be found; new levels of generosity are going to have to be arrived at; new commitment to solving this problem in partnership with the Third World is going to have to be discovered.

Mr. Chairman, it was I guess Wernher von Braun who said, reflecting on that first rocket launch, that the real obstacles were gravity and bureaucracy. I'm not sure what the moral equivalent of gravity is for us today but bureaucracy is still our problem. It's not just government bureaucracy. It's corporate bureaucracy; it's institutional bureaucracy; it's conventional wisdom it's doing things the way we are used to doing them; it's a lack of urgency about the problem. The way I resolve that problem is to look at my children. We should all do that. Thank you very much.

TITLE: Policies and Processes
Necessary to Achieve
Sustainable Development
SESSION: A.1
BULLETIN NO.: 4

DAVID BUZZELLI

Sustainable development is a journey rather than a destination. The achievement of sustainable development will require widespread consultation to integrate environment and economy in each industry. Industry cannot wait for a fully articulated plan, but must respond immediately in four key areas:

- **Participation.** Industry must be a willing participant in round tables, involving the perspectives of its leaders and employees and consulting with concerned citizens and government.
- **Education.** Industry can play a key role in lending expertise to the education of employees, stockholders and the public.
- **Improved Performance.** Industry must work toward improving processes and products to minimize negative impacts.
- **Codes of Practice.** Industry must establish codes to integrate sustainable development principals into their operations, and avoid temporary solutions.

Government must also improve by adopting a global perspective; sponsoring improvement of industry practices; by making difficult decisions; and by motivating industry through dialogue, simplification of regulation, recognition of industry contributions and co-operative initiatives. Government and industry must become partners to achieve sustainable development.

SUSAN HOLTZ

A definition of sustainable development provides a framework for public policy: "Social and economic arrangements whereby people's present needs are met in ways that don't impair the ability of others in present and future generations to meet their needs." Economic activity is just the means of meeting human needs.

Certain realities must be acknowledged:

- 90% of current global human activity is not sustainable.
- Some human needs are not met, in Canada and elsewhere.
- Some "free" sources of services and food are significantly diminishing in value (due to women entering the paid workforce and environmental degradation), but this loss is not shown by conventional economic measures.
- growth in the easily measured part of the economy is not necessarily a good thing.

In the sustainable development formulation, "meeting human needs" is an explicit goal, requiring the evaluation of needs, equity and biophysical constraints in all activity. Enhancement of social policies -- including economic justice and the impacts of trade for developing countries--will become central in the political agenda.

The responsibility for implementing sustainable development lies with governments. All government activities add to or detract from the environment's capacity to satisfy human needs. Government must adopt a formal and enforceable sustainable development assessment of all of its actions as well as those of industry. Greater participation in this by the public is essential.

BRUCE STRACHAN

Concerns in British Columbia include the use of atomic power, economic benefits from the use of wilderness, and negative environmental impacts from accidents. These issues will be handled through pro-active policy and action by government.

A B.C. task force is preparing recommendations for a long-term environmental strategy and environmental education. An existing program employs unemployed youth on environmental projects.

B.C. has adopted the toughest pollution regulations in Canada for the pulp and paper industry, which is poisoning the air and the water.

DISCUSSION

- Concern was expressed about monocultures in agriculture and forestry. Buzzelli noted that the chemical industry is developing pesticides having much lower concentrations and narrower impacts.

PARTNERS FOR THE FUTURE

David T. Buzzelli

President and Chief Executive Officer
Dow Chemical Canada Inc.
P. O. Box 1012
Sarnia, Ontario N7T 7K7

Thank you for inviting me to discuss sustainable development from the perspective of industry.

If we'd been paid 50 cents for every word that's been written on sustainable development to date, we'd be wealthy. If we'd been paid 50 cents for every action taken, we'd be paupers. I'd like to add my 50 cents worth to the discussion by suggesting some current opportunities for action by government and industry.

Sustainable development is really a goal -- for the planet, for Canada, for each province, each business and eventually, each individual. It is a journey, not a destination. It calls for a better understanding of the environmental stresses on the global ecosystem we share. And it calls for the ability to work together to foster a responsible integration of environment and economy. Sustainable development is basically a concept of stewardship to ensure that our resources will not be jeopardized for future generations. In the words of Herman Daly, it means "not running the earth as if it were a business in liquidation."

A vision of what sustainable development will mean for Canada will be arrived at through broadly based consultation. The Round Tables will provide the forums for these discussions. In the meantime, industry and government need to get on with initiating the process of integrating environment and economy in the context of their own organizations. We can't wait to take action until a fully articulated vision and strategic plan is presented and agreed upon.

Some of you may be wondering why industry believes it has a role to play in the process of moving the nation toward sustainable development. Some of you may even question industry's motives for getting involved.

Historically, industry has been seen as a major cause of the environmental problems that plague the world today. And to varying degrees, that may be true. But industry also has the means and the desire to be part of the solution. As Madame Brundtland said in Our Common Future: " The 'environment' is where we all live; and 'development' is what we all do in attempting to improve our lot within that abode. The two are inseparable."

Industry must work diligently to reduce the negative impacts their products and operations have on the environment and, at the same time, enhance the positive ones. But why? Because it makes good business sense -- from both ethical and economic perspectives. Sustainable development is the right way to manage.

Are we there yet? No. But this is the goal industry shares with people from government, environmentalists and the Canadian public.

How can industry contribute to the goal of sustainable development? By taking action. There are four key areas where we could make a contribution today. Let's take these one at a time. The first area is participation.

Participation

Industry needs to sit down with concerned citizens, government people and people in the communities in which they operate to discuss issues of mutual concern. Establishing dialogue is key. Only through dialogue can a company, or business, or industry ensure that its policies or programs take into account the expectations of the people who may be affected.

Let me give you an example. In Sarnia, Dow recently formed an advisory panel to apprise us of the community's concerns about our proposal to build an incinerator to upgrade our on-site waste management program. The panel will also suggest how we should communicate with the public about the project. We want to understand the community's concerns from their perspective before any action is taken.

Similarly, industry should involve the public in its efforts on sustainable development. As Roy Aiken of Inco says, "Any time that you can put government, industry and non-government organizations in the same boat without rocking it, you have an unbeatable coalition." The Task Force on Environment and Economy proved that consultation builds commitment. And commitment leads to action.

Industry should be a willing participant at the Round Tables -- and that participation should be greater than the three or four industry representatives on each Round Table. Industry people should bring to the Table the cumulative perspectives of their employees, the leaders in their communities, their trade associations, and local business associations. I believe Canadian industry is prepared to be a full participant today.

Education

The second key area where industry can make a contribution is education. Sustainable development will only work if all of us make tough choices -- industry, government and individuals. Understanding the issues and opportunities encompassed by the responsible integration of environment and economy will be essential if people are to make positive choices. People must understand they share responsibility for "our common future". Education will be key.

What does industry have to offer? It has resources, it has scientific expertise and it has a desire to help.

Industry can work with educators to develop curriculum that presents a balanced view of the choices we will have to make as Canadians. The Canadian Chemical Producer's Association is working on a chemical literacy series called "Chemicals and the Environment" with the SEEDS Foundation. SEEDS stands for Society, Environment and Energy Development Studies. The curriculum currently being designed could easily encompass the principles of sustainable development. Many industry sectors -- like agriculture, pharmaceuticals, mining, and pulp and paper to name just a few -- could offer their perspectives and resources to similar programs.

Another initiative is Dow Canada and Inco's recently announced sponsorship of a new MBA program on the management of sustainable development at the University of Western Ontario. The program will begin in the spring of 1990. Its goal is to teach future business leaders of their role and responsibility to integrate environmental considerations into their business decisions.

Industry can also play a key role by involving their employees and shareholders. These folks need to understand what sustainable development is, what changes are necessary for the company to become sustainable and what they can do to help. Through education initiatives like these, industry can contribute to positively changing the attitudes of the next generation.

Industry, governments and non-government organizations all need to assist with the sustainable development education process. We must pool our talents and resources to help Canadians understand the relative environmental and economic 'costs' associated with the products and services they demand. Better understanding will help change the attitudes of our consumer-driven, throw-away society. Our mutual goal should be a more holistic approach where all Canadians share concern and responsibility for the integration of environment and economy.

Improved Performance -- Getting Our House in Order

The third key area is improved performance -- getting our house in order. Besides cleaning up past problems, industry must work hard to continuously improve its performance. Industry has an ethical responsibility to protect the health and safety of people and the environment throughout the life cycle of their products. To do so they must continuously improve their products and processes.

Every member company of the Canadian Chemical Producer's Association has signed a commitment of Responsible Care which states we will do just that. Basically, we've made a contract with the public for the right to do business in the future. Now we're working to put into action the six Codes of Practice that will enable us to live up to this commitment. We know we must be accountable to the public if we hope to earn their trust and respect.

The CCPA is trying to encourage other industry sectors to make a similar pledge. Incidentally, the Canadian Petroleum Association defined their environmental code of practice last year. And CCPA's Responsible Care program is being adapted by other chemical manufacturer's associations around the world including those in the United States, Britain and New Zealand.

Industry Sustainable Development Principles

Finally, industry should establish sustainable development codes of practice or principles. To make sustainable development a reality, every business, every government ministry and every industry sector will have to look at its own culture and define its direction for the future. Leaders in all of these sectors will have to take what they know about sustainable development, adapt it to their own organizations and use it in their daily decision-making.

Imagine if each leader in Canadian industry asked two questions today: What does sustainable development mean for my business or industry? What do we need to do to become sustainable?

The responses could become the foundation for a statement of basic principles for each company. If these codes integrated environmental considerations into all economic decisions, we would be on the path of realizing sustainable development in Canada. We would be working on prevention, rather than spending our energy putting Band-Aid solutions on problems caused by past practices.

The Dow Chemical Company articulated its Core Values three years ago. This experience taught us that it is not the statement that is important, it is the process of developing and communicating a statement that is really important. That people are willing to put the statement up on the wall and defend is important. The process of getting industry to share common goals would, in itself, be a significant achievement.

Industry Expectations of Government

As we go through this process of change, industry has some expectations of government as well.

Leadership

Let's look at leadership first. Once the various players have articulated Canada's vision of sustainable development, governments should demonstrate the path we all must take to realize this vision. Government must be able to keep the big picture -- the long-term, global vision -- in mind, while going to work on the priorities of today. Both the macro and micro aspects of sustainable development must be assessed and managed, and government is probably best suited to manage the interface of these two levels.

Governments will need to support the Canadian vision of sustainable development by changing or adapting to meet the challenges ahead. New systems and processes for decision-making will have to be created. Innovative thinking, consultation, accountability and the ability to balance the realities of today and the goals of tomorrow will be essential.

I'm really impressed with an innovative federal job creation program called "On Site" which uses unemployment insurance money to create jobs for unemployed university graduates with environmental backgrounds. The new grad works for a company in an environmental capacity on a project basis. To date about 65% of the people in the program have been hired permanently. This is very creative solution to both Canada's environmental and employment problems. We will need many more innovative solutions like this in the years to come.

Improve Performance

Just as industry needs to improve its performance, governments too should spend more time putting their houses in order.

People in and out of government have told me they question the ability of government to change the decision-making process, the bureaucracy and the organizational politics that are barriers to change. Now governments have the opportunity to prove them wrong!

First, government must put an end to political fragmentation on sustainable development -- this is a global issue, not a federal, or provincial, or municipal issue. Dialogue is a powerful tool. The process of sustainable development would move much further, much faster if the quality of dialogue improved -- dialogue between ministries, dialogue between politicians and bureaucrats, and dialogue between governments, industries and non-government organizations.

One way to improve dialogue is through exchange programs between industry and government. Exchanges are a great way to get a better perspective on the other's point of view. I'd like to encourage more of these as we move along the path towards sustainable development.

Another way governments could improve their performance is by getting over the NIMTO syndrome. NIMTO means "Not in My Term of Office" and it applies equally well to business executives as politicians.

We just don't have the time for political paralysis on the issue. Good leaders must chart the course for the future then steer when necessary to keep on track. We can't change course or abandon the ship in mid-stream just because there's been an election of a new government or a new CEO -- if we do, we'll never reach our destination.

Motivation

Finally, let's look at the issue of motivation. How do you motivate industry to do better than what's required by law? I suggest you offer them carrots, not just sticks.

Governments and, I might add, non-government organizations, need to find ways to recognize the contributions of the many companies that are doing more than just meeting regulatory requirements. Recognition will do two things -- it will encourage the company to continue its quest to improve and it will establish that company as a model for others. Recognition will accomplish these things positively, without holding a stick over a company's head. And recognition is a real motivator.

Recognize that industry is trying. Inco is a good example. In the past couple of years Inco has put a considerable amount of time and money into environmental improvement initiatives. And they have taken a leadership role in the public process as well. Let's use Inco as a positive example of one company that has made a commitment to sustainable development and is following through with action.

By the way, recognition works both ways. Industry could do a much better job of recognizing the contributions politicians, civil servants and many members of non-government organizations are making to the process as well. And recognition is action that could begin right now.

Governments and non-government organizations must work cooperatively with companies who are trying to come up with new and better solutions. These may be existing companies that are looking at ways to improve their products or processes, or they may be entrepreneurial companies seeking new or better ways to recycle wastes or develop new products or new markets from recycled materials. In either case, encourage and support their efforts. The Dow/Domtar joint venture to recycle plastics is an example of two companies putting their resources together to come up with new solutions to the waste problem. Let's find more ways to support and encourage projects like this. And let's communicate about these new initiatives. Environment Canada's success stories bank is a good start.

Government should make a determined effort to explore all mechanisms to foster change -- even incentives. Spending more money today to prevent problems in the future must be given careful consideration, both by my own company and others. We need to find ways to motivate people to spend money on prevention, rather than putting band-aid solutions on past problems. Even taxes for natural resource use should be assessed. Let's work together to explore these and other options.

Sustainable development demands that industry, government and non-government organizations work together more effectively. We need to become partners in sustainable development -- the future of our children, our nation and our globe is at stake. We need to change our attitudes and our processes. Let's begin by taking action. Every step counts. Let's start today. Let's take the first step on the path of sustainable development together.

POLICIES AND PROCESSES NECESSARY TO ACHIEVE SUSTAINABLE DEVELOPMENT

Susan Holtz

Senior Researcher, Ecology Action Centre
4 Umlah's Road
Halifax, Nova Scotia B3P 2Q6

Introduction

I'd like to start my examination of this topic by noting that it strikes me as being about the right size for maybe a 10-volume study; but, I will nevertheless endeavor to cover at least an outline of my approach to thinking about it in my allotted 20 minutes. Rather than listing what all the policies and processes are for sustainable development, I will step back a few paces and look at a framework for understanding public policy decisions and sustainable development; in passing, I will discuss a few examples of needed policies and processes.

A Working Definition of Sustainable Development

"Sustainable development" has been defined with different wordings, but the gist of it is (as I would phrase it) "social and economic arrangements whereby people's present needs (defined by themselves) are met in ways that don't impair the ability of others in present and future generations to meet their needs". Thus, equity is an important component of this concept.

As well, I acknowledge that this is a human-centred definition, but I would also add that, since David Hume in the 18th century effectively demolished the notion of objective or external truths -- that is, values apart from humans who conceive them -- I don't think that any other approach is intellectually tenable. But this is a side issue which there is not sufficient time to go into here.

A key point about this definition is that it re-directs debate about whether economic growth is a good or a bad thing -- i.e., about whether growth is an appropriate end -- to putting economic activity in its proper place, namely as a means (though, as I will discuss, it is not the only means) of meeting human needs. This definition also for the first time puts the right question squarely in the middle of the political agenda. Are human needs in our society being met? should clearly be the first question. After that, we need to ask if the ways we are doing that are sustainable. If needs are not met, or are being met in ways that significantly impair others' abilities to meet their needs, now and in the future, we need to search for alternatives. That, in simple terms, is what sustainable development is about. Its implementation is going to be a huge task.

How Human Needs Are Met in Society

Human needs, of course, range from the physical needs related to immediate survival to social, psychological, cultural and spiritual needs such as belonging, a feeling of personal usefulness, and self-realization. In general, there are four mechanisms through which human needs are satisfied in Canada. These are (1) through private purchase (food, clothing, housing); (2) through public purchase (health care, education, various subsidized services); (3) "freely" through social relationships and personal activities (child care, peer and family relationships); and (4) "freely" directly from the physical environment (air to breathe, recreation, esthetic and spiritual perceptions). Of course, all these activities are based on "free" environmental services like energy from sunlight and the bacterial breakdown of wastes, and on resource inputs from the environment. There are also human needs which go unmet.

The particular mix of human activities through which perceived needs are systematically supplied makes up a society's real economy, although we usually think of an economy only in terms of financial transactions. The mix of means individuals use to meet their needs varies personally and from one society to another, even from one region to the next. In the North and in Atlantic Canada, for instance, a "bush" economy of hunting, fishing, and berry-picking supplies a considerable quantity of "free" food. Similarly, many services supplied a few generations ago by women as part of their role as wives and mothers can no longer be produced "free" through these social arrangements as more and more women work in the paid labour force.

There are several points that arise from thinking about this schema of meeting needs. First is that the focus of most economic thinking in Western countries has been on the provision of privately purchased goods and services, plus some concern with public services. As a result, the other parts of the mix have been systematically undervalued, and indeed, in many cases, are virtually invisible. Their erosion, though experienced as a quality of life loss, does not weigh with economic and political decision-makers as seriously as a drop in GDP, although this is in effect what is happening. The invisibility of this sector of activity and of environmental inputs and services also hampers our ability to see the enhancement of this contribution to meeting human needs as a valid policy option.

In the 1980's, many conservative governments brought a bias into public policy toward mediating human needs through private purchase -- that is, primarily through the market sector. But often, this approach leaves much to be desired in terms of environmental stress and unmet needs. Take the need for mobility, for example. While few would dispute the desirability of the private automobile in many situations, the degree to which this mode dominates transportation options directly affects urban air quality, and contributes to acid rain, forest die-back, and global warming through carbon dioxide emissions. Policies which maintain the automobile's dominance contribute to a de-humanized and congested downtown, further disenfranchise poor, elderly, and disabled people who don't own cars, and reduce the need and the opportunity for routine healthy exercise in getting about. Merely regulating the technology will not address these problems; alternative systems for personal mobility needs are required, and these are not going to come about through the operation of the market by itself.

Limits to Growth -- Again?

At long last, we are thus going to have to move away from assuming that all growth in the easily measurable portion of the economy is necessarily a good thing. And if this sounds like the resurrection of issues raised by the "limits to growth" and the "conserver society" debates, that is exactly correct. But sustainable development is several steps further along in its analysis than its precursors.

In the sustainable development formulation, "meeting human needs" is an explicit social and economic goal, a starting point from which questions about policy and decisions must flow. In the earlier debate, the policy question was, "what must we stop doing in order to save the environment?". The question today has several parts, including querying if human needs are being met as well as whether the ways needs are met impairs the ability of others to meet their needs.

Today's focus thus requires the evaluation of needs, equity and biophysical constraints in all decisions about economic activity and government policy. We are no longer talking only about environmental regulation of otherwise acceptable activities; we are reviewing the adequacy of our social and economic activities by the standard of this goal. We need to be assessing systems, not just individual projects, products, or programs. And that means, when we turn to making sustainable development happen, the focus must be on the overall policy agenda and on the political processes through which decisions are made.

The Policy Agenda

Let me say straight away that my remarks so far should not be construed to mean that I think that there is no role for the private sector or that all economic growth in Canada should be halted. Far from it. Since I believe many needs are not being met, both in Canada and elsewhere in the world, and since many of the ways we do meet needs are clearly impairing the biophysical basis for human society, it is obvious that change, curtailment and growth in different economic activities will variously be required. There is no reason why the private sector should not continue to play a role in our mixed economy, though I would also like to see a much better understanding of the roles played by the private, the public, and the non-market means of meeting needs in Canada.

However, if governments are serious about sustainable development, the enhancement of social policy must, almost by definition, move to the centre of the political agenda. Government policy must shift away from its present focus on encouraging private sector growth as an end in itself and start addressing whether and how human needs are being met in this society, and how our actions affect others. The questions of international trade and economic justice for the developing world, and of international security for all countries must be part of this agenda. Issues like gender equality and child care arrangements must be recognized as being as crucial to sustainable development as technology development and environmental regulatory initiatives.

This is not to say that concerns about government spending and fiscal policies should be set aside. Responsible management of any enterprise, from a government to a business to a household, is of course necessary. But social policy should not be tagging after economic policy; it must be central.

Public Decision-Making Processes and Sustainable Development

The private sector of business and industry has a critical role to play, especially in technological innovation in both product development and production processes. Citizens also have important roles, which I will presently elaborate on. But in the latter part of the 20th century, the central role in implementing sustainable development lies with governments, particularly provincial and federal governments.

This is simply because of the pervasive role governments have today. Government activities include legislative and regulatory actions, revenue-raising (which also allows tax expenditures for approved activities), and spending on everything from programs to crown corporations to specific projects to the activities of government departments. Through these three activities (i.e., regulation, taxation, and spending), governments either make or influence an enormous number of decisions that shape the way needs are met (or are not met) in society. Regulatory actions restrict products and drive investment in alternatives; tax spending, and economic equity; and government spending through departments, programs, and crown corporations puts projects and services "on the ground".

All of these government activities either meet needs or don't meet them adequately (or as adequately as alternatives could), and all of them support or detract from the environment's productivity and diversity and from other societies' efforts to meet their own needs. What processes can we develop that will influence government decisions toward sustainable development?

Factors Influencing Government Decisions

The government decision process can be outlined as a linear flow of information and influence. It originates in the values held in society by individuals and groups, and which are brought to bear on government decisions through the media, through parliamentary debate, through the pre-existing information and bias of the decision-makers themselves, and through lobbying and consultation with individuals and groups like non-government organizations (NGO's), business groups, and other levels and agencies of government. (It is a serious mistake to assume that "government" is a monolithic single interest; since government is so large, different agencies often have opposed interests.) The decision process itself results in decisions concerning the above-mentioned three areas of government activities: government spending (how much and on what); taxation (how much and from what); and legislation/regulation.

The outcome of a government decision process is influenced by four factors. These are:

- practical constraints, which usually include costs, political considerations, perceived technological factors, and so forth
- external "rules", including existing legislation, specific policies, and international treaties which affect possible options;
- the internal decision process, that is, the factors that are explicitly considered in the decision; and
- participation in the process, that is, who (which groups and individuals) are consulted in the process and how that consultation is structured and weighted.

In terms of what government decisions should address sustainable development, it should be clear by now (not only from this paper, but from the Brundtland report, the World Conservation Strategy, and other literature) that all decisions need to be framed by this concept. But how can that begin to happen when the whole thrust of management of government activities has been to compartmentalize and subdivide responsibilities into so many individual pieces?

To start with, there must be a formal and enforceable commitment to assessing the sustainable development aspect of spending commitments, taxation, and regulation. We are a very long way from there, not only in the political will to do this, but simply in developing operational criteria to use in such assessments. Environmental impact assessment of programs and policies is a start, and one that at least branches off from the assessment of projects, which is a process with which we have some familiarity. (Although it must be stressed that as yet there is still no commitment on the part of federal ministers in departments like Defence, Public Works, and Energy, Mines and Resources to have their departments constrained by environmental impact assessments.)

Secondly, there is the question of participation in the decision-making process. To date, except in environmental initiatives, consultation with the public has been extremely limited and quite unsophisticated in government decision processes. Business organizations and individual interest groups have often had the ear of an individual minister, but serious attention to the process of consultation has been lacking. Nevertheless, it is only through opening up more avenues for public consultation (and how to do that right is a topic I've written quite a lot on in other places) that an appropriate spectrum of values and knowledge can be brought to bear on complex questions of public policy for sustainable development.

Thirdly, the external rules -- existing legislation and policy frameworks -- need review. In particular, decisions on programs and projects would benefit from sectorial policy frameworks and land use planning frameworks that at present simply do not exist, although some are in the process of being developed, such as provincial Conservation Strategies. My own wish list for sustainable development policy frameworks would include environmental planning acts; energy policy, agriculture and food policy; transportation policy; international security; health; education; income and family support; renewable resource use; and so on and so forth.

Conclusion

Talking about policies and processes for sustainable development is necessarily abstract, and vivid and arresting images to illustrate my analysis are few and far between. Despite this academic presentation, I am in fact convinced that every year, almost every day, sees options foreclosed as we fail to act on worsening human and environmental crises. But at the same time, paradoxically, I also believe that sustainable development only happens through the pervasive transformation of every day political and economic decision-making. I expect that that is going to absorb a lot of human energy, because the natural tendency of institutions is to resist change; and I hope this paper and this conference will help move things even a few paces forward down a very long road.

ENVIRONMENT IN TRUST

The Honourable Bruce Strachan

Minister of Environment
Room 124, Parliament Buildings
Victoria, British Columbia V8V 1X5

Thank you for inviting me to join you this morning as the representative of the Canadian Council of Resource and Environment Ministers.

In the three years I have served as British Columbia's Minister of Environment, I have seen a fundamental shift in the way Canadians approach Environment and Economy issues.

We no longer see environmental protection and preservation as just an accessory to the process of planning resource use and development.

Awareness of the environmental impacts of industrial activity -- and concern that resources won't always be there for the benefit of future generations -- have made all of us realize that Industry, Governments, and the Public each have a major stake in ensuring sustainability.

In my view, there are few places in Canada where the links between Environmental Sustainability and Sustainable Development are as strong as they are in British Columbia.

We often describe our Province as super natural B.C. -- and for very good reason.

Our fish, wildlife, and natural resources make us the envy of visitors from around the world. The province is home to 175 percent of the world's Stone Sheep, 65 percent of the world's California Bighorn, 60 percent of all Mountain Goats, and up to 20 percent of the world's Grizzlies.

Our provincial park system is among the finest anywhere, with well over 5 million hectares covering an area nearly 10 times the size of Prince Edward Island.

But just as we are blessed with such an abundance and diversity of natural resources, we are also dependent upon them for our economic well-being.

We have more timber than any province in Canada, and exports of forest products total nearly 9.5 billion dollars yearly -- accounting for 46 percent of the total value of shipments from our manufacturing industries.

Our metal and coal mines produce total revenues of about one and a half billion dollars annually.

And next to Quebec, we have the highest hydro power potential in Canada, over 90 percent of our electrical power comes from hydro sites and generates nearly a quarter of a billion dollars a year in Provincial revenues.

Adventure vacations, whale watching, and similar activities now generate a half a billion dollars a year in British Columbia. When combined with the revenues from consumptive uses like hunting, fishing, and trapping, the result is substantial economic benefit throughout the entire province.

These resources must be sustained for our economic well-being. They must be sustained to support fish and wildlife, and their intrinsic value must be sustained for the enjoyment of the future generations.

British Columbians have always held strong views on the environment. We have so much worth protecting that we're quick to demand responsible stewardship of our natural resources, and we're quick to feel threatened by environmental abuses, accidents, or emergencies. And today, those feelings are stronger than ever.

Through television, British Columbians have seen wildlife and seabirds struggling for survival in the aftermath of the Alaskan and West Coast oil spills.

Every day, they read newspaper reports of Global Warming, Dioxins, Acid Rain, PCB'S, CFC'S, Pollution, and Contamination.

As a result, there is increasing public demand for more diligent, more scrupulous management of the environment. As is the case in the rest of Canada, British Columbians want industry to assume greater responsibility for environmental quality, and want tougher enforcement of environmental law.

In short, environment is at the top of the public agenda, and its sustainability is now the guiding principle of development and resource management in British Columbia.

In my view, sustainability depends on developing strategies and initiatives to "anticipate and prevent", not "react and repair" environmental damage after its been done.

In British Columbia, we aren't strangers to making anticipation and prevention a key part of environmental protection and resource development.

For example, I chair the environment and land use committee of Cabinet, which anticipates and prevents by achieving the right balance between economic development and preservation of the environment.

The committee contains a mix of the Ministers responsible for resource development, resource conservation, and community development. It's there to make sure multiple resource uses don't conflict, but generate optimum economic, social and environmental benefit.

The committee is one of the three main policy committees of Cabinet, reflecting the importance the Government attaches to anticipation and prevention of the environment and economic development.

For industry, the committee is a good window on Government--especially when development plans call for interaction between the private sector land several agencies or Ministries.

It ensures the resource management guidelines of one sector don't interfere or clash with those of another. And it is an important forum for the integration of sound resource management principles at an early stage in the planning process.

In essence, the committee makes sure anticipation and prevention is "built-in" to development proposal to a greater extent than in many other jurisdictions in Canada.

The Brundtland world commission on development and our national task force on environment and economy have both stressed that a sustainable environment and sustainable development can't be achieved without innovation and fresh initiatives.

While the environment and land use committee has put British Columbia on the road to sustainability, more must be done if we are to successfully answer the action calls of the commission and the Task Force.

That's why, in January, we appointed our own Provincial Task Force on Environment and Economy. Chaired by Dr. David Strangway, President of the University of British Columbia, The Task Force has the job of strengthening the links between Environmental and Economic objectives in all aspects of resource management, including energy generation and use.

Comprised of representatives from Industry, Government, Labour, Native and Environmental organizations, it will make recommendations in several vital areas including:

1. Creating a permanent forum of public and private sector decision makers to advise on the integration of environmental management and economic development;

2. Developing a Provincial Conservation Strategy aimed at long term environmental protection and effective resource use; and

3. Promoting understanding of the bond between the environment and economy through Environmental Education.

The Task Force recommendations will go to Cabinet in June.

The work of the Task Force will give us the policy framework for anticipation and prevention over the medium-to-long term.

But there must also be direct action to address current public concerns about the quality of our environment.

We need to reduce pollution, contamination and other threats to public Health and Environmental Safety.

The Ministry of Environment in British Columbia has given clear signals that those kinds of serious environmental and health impacts will not be tolerated.

As I mentioned earlier, the Forest Industry is vitally important to our provincial economy.

But this doesn't entitle the industry to a free reign at the expense of the Environment and Public Health.

This year, we've brought in some of the most stringent standards in Canada for discharges, effluents, and pollutants.

To assist in anticipating and preventing Acid Rain before it can happen, we have set a new, province-wide standard to limit the sulphur content in industrial fuels to 1.1 percent.

This is going to mean a significant improvement in air quality, especially for those communities in Southwest B.C. vulnerable to Acid Rain.

In addition to setting province-wide standards, we're moving to reduce pollution at source, by intensifying monitoring and enforcement, and by creating timetables for improvements.

Last Friday, I announced strict controls on Dioxins discharged from British Columbia Pulp Mills. These new measures are the toughest in Canada to date, and will virtually eliminate Dioxins from mill effluents.

Under these controls, mills must substantially reduce discharges of Chlorinated organics by the end of the next year. Further reductions will be required by the end of 1994.

And the cost of meeting these standards is not cheap, the total bill for our pulp industry is expected to be in the neighborhood of $800 Million.

Also in the forest industry, we are taking action to restrict the use of anti-sapstain chemicals and other lumber treatment preservatives that threaten the quality of our environment.

As an added measure, we're backing up our waste management Legislation by increasing fines for serious environmental offences from $50,000 to one million dollars.

The oil spills off the coast of Vancouver Island in January and, more recently, in Prince William sound made it clear that stronger coastal environmental protection measures are also urgently needed.

We must ensure we reduce the likelihood of spills and are better able to deal with cleanups, when they are required.

That's why the Governments of British Columbia, Alaska, Oregon, and Washington have established an oil spill task force to review shipping safety and emergency response procedures.

From my perspective as British Columbia's Minister of Environment, the Task Force needs to apply the "Anticipate and Prevent" principle in a number of areas.

These include:

1. Reviewing the regulatory requirements governing the Operational and structural safety of oil tankers and barges;
2. Examining the adequacy of procedures for reporting and monitoring environmental emergencies;
3. Looking at ways to reduce response times and improve methods of mobilizing manpower and equipment; and
4. Streamlining the mechanisms for determining liability and handling compensation claims.

In addition to the oil spill Task Force, the Government of British Columbia has appointed Environmentalist David Anderson--Well known for his work to ensure the environmental safety of oil transport--to conduct public hearings in coastal communities and to advise on the adequacy of spill response and cleanup procedures.

These two initiatives will make a sizeable contribution to preventing the recurrence of the recent spills, or at the very least, ensuring they cause a minimum of environmental damage of disruption.

We've come a long way since the Brundtland commission and the National Task Force brought the environment to the front and centre of public concern.

My province and several other jurisdictions have established Task Forces or Policy Development Groups to create strategies for sustainability.

There are tough regulations and fines for offenders.

And there is sharply increased enforcement of environmental laws.

But if we are to be certain of environmental sustainability, we must give the decision-makers of tomorrow the right tools for continued responsible stewardship of our natural resources.

We face the challenge of providing young Canadians with the environmental education needed to do the job.

They need a chance to increase their knowledge of environmental issues and concerns, and to acquire environment management skills.

And they need a chance to gain experience by applying the knowledge and skill in their communities.

My Ministry recently launched the Environment Youth Corps of British Columbia, which is designed to supplement environmental education by giving young British Columbians hands-on experience at environmental enhancement and preservation.

The Youth Corps will employ young people between the ages of 16 and 24 for a wide range of environment-related activities, including:

1. Working to enhance fish and wildlife habitat:

2. Improving recreation facilities in Provincial Parks and Forest Recreation areas:

3. Gathering and analyzing environmental data; and

4. Delivering environmental education programs in our schools.

I think we have a good reason to be optimistic, and that's the thought I'd like to conclude on.

Today, the political will exists to move quickly to solve environmental problems, address current environmental issues and concerns, and lay the groundwork to meet the changing demands on our resources.

We are beginning to share responsibilities for environmental protection and enhancement and for balanced economic development.

We are beginning to share responsibilities for environmental protection and enhancement and for balanced economic development.

We are beginning to meet the challenge of successfully building for what Gro Brundtland so aptly described as: "our common future".

Thank you.

TITLE: New Methods For Improved
Decision Making
SESSION: A.2
BULLETIN NO.: 5

FRED ROOTS, Chairman, Canadian Environmental Assessment and Research Council, and Science Advisor, Environment Canada said that since decisions we made in the past have led us to the environmental problems we face today, it is imperative that we change the way in which we make those decisions.

"We need better methods" Roots said "unfortunately, there is no quick fix through technology."

Decision making is complex he said, and must take into account perspectives of consumer groups, government bodies, economic concerns and social concerns - perspectives not necessarily always compatible with each other.

Roots said that generally decision making occurs in three basic loops: the market place loop which raises issues of industry, consumers and government regulatory groups; a social loop which inputs values based upon education, human welfare, and the church; and a political loop representing all levels of government. Any change in one of the elements in each loop impacts on all the others. We must change our decision making methods in order to address all concerns in each loop. In addressing each concern we must also consider the long term effect, include influences on a much broader range of actors and actions and bring about greater integration between actions of people and the environment.

Basic to sustainable development is the decision whether activities are to be human centred or earth centred on which people are merely passengers.

Our decision making tools are scientific, biological understanding and new technology, Roots said. We have begun to apply technology to integrate massive resource information. The problem he said, is the short term focus, a legal system that is adversarial and based on precedence and some "sacred cows". Roots said the latter will have to examined in an objective way if we are to change our methods of decision making.

Decisions in the future are going to be rough Roots added. There will be more government control, fewer subsidies, more volatile reactions, and more local involvement.

BILL HARPER, General Manager, ID Systems Ltd. addressed the issue of handling massive resources information through use of desk top geographical information systems (GIS) which use personal computers. Some of the capability and features of this tool are:

. an easy to use key-word menu
. accepts common map projections
. efficient data structure (can store up to 1,000 maps on a 30 mb hard disk)
. Overlays up to 14 map themes at a time
. offers complex point and area modelling functions
. interfaces with other GIS's
. produces map contours with point data
. provides high and variable resolution (up to 1/33,000th of any map universe)
. uses windows to zoom in on images
. produces overlays in minutes
. produces statistical reports on overlay results
. prints maps or text on dot matrix, lazer, inkjet and line-plotting equipment

The advantages of the system, Harper explained, are that it provides for accuracy, ease at which "what if's" can be tested, and speed at which data can be retrieved. In particular, Harper said a lap-top with all the information can be taken to a public meeting and participants at the meeting can experiment with different scenarios.

DISCUSSION

Public participation was a main issue and how information can be more widely distributed to the public in a fashion more readily understood. Generally it was felt that the public understands issues more clearly than "experts" give them credit for, but that there is a reluctance to provide information up front, early in any project. It is imperative that the public be taken into full confidence from the very start. A number of tools do exist for participation by the public and some industries are making excellent use of those tools, although much more work could be done in this area.

DECISION-MAKING AND SUSTAINABLE DEVELOPMENT -- SOME REFLECTIONS ON CHARACTERISTICS AND PROBLEMS

Dr. E.F. Roots

Office of Science Advisor, Environment Canada
Hull, Quebec K1A OH3

Abstract

Although human activities are only in part the result of deliberate decisions, most of the environmental and economic problems faced by society today are the result of the decisions we have made, consciously or unconsciously, in the past. The achievement of a more sustainable way of life, which can only be realized within a natural environment that is healthy and productive, will require conscious decisions to change traditional goals and established practices. Effective decisions arise from widely held attitudes and values, and shared assumptions about the relationships between human needs, institutions and opportunities for actions, and available resources. Decisions that will bring about sustainable development will need to change those attitudes, values and assumptions to incorporate greater awareness of environmental and natural resource matters, and give greater value to the long-term consequence, at all stages in the often quite different, but inter-connected decision-response loops that control the operations of commerce, personal relations, and politics or governance. Sustainability will require that the decision-making system become concerned to an increasing degree with what happens to the Earth, and not exclusively with what is the effect on humans. New scientific, technological and institutional tools make it possible to identify a wider range of choices and options and to assess the "sustainability" of the effects of decisions than has been possible in the past. But many obstacles lie in the way of making decisions that will lead to sustainability, including the entrenched socio-economic managerial system, an increasingly short-term focus for business and politics, an adversarial legal system, a social reward system that discourages co-operation for the common good, and some "sacred cows" of society that relate to human population growth, the rights of individuals and the dominance of the human species. A state of continued environmental productivity and sustained economic viability is likely to be not one of stability, but of increased government control to ensure attention to widespread and future consequences, fewer subsidies and thus less protection for the unfit, greater attention to natural changes and more local involvement in decisions.

The Problem and the Assumptions:- the Need for Change and for Changed Decisions

In the past year or so, the number of conferences, special committees or commissions, thoughtful articles and books dealing in the concept of Sustainable Development has been increasing, and there is no sign of a slackening. Questions having to do with the long-term sustainability of present practices are an important topic of the discussions in industrial boardrooms and government meetings at all levels in Canada and many other countries, whereas ten years ago these subjects, while often the private concerns of the same individuals, were very rarely on the agenda. The questions of the sustainability of economic development and the longer-term environmental and resources consequences of our current activities and plans have moved from individual private doubts to open public concerns, and from the domain of environmental interest groups and academics to the decision-making tables of industry and government. This conference, with its wide spectrum of participants with different backgrounds and interests, all focussing on the sustainable relationship between the economy and the environment is evidence of this. What has happened? Will this new activity of talking about sustainable development and economy-environment relationships in a decision-making, managerial, or policy context have any real effect on the concerns being talked about? What is needed to move the talk not just to action, but to greater sustainability of the environment and thus to sustained development?

The World Commission on Environment and Development (the Brundtland Commission) brought into sharp focus, with evidence that could not be denied or shrugged away, that at all scales, from those that concern each person to those of the planet as a whole, and in all political and economic systems, we are individually and collectively facing a very serious problem. The problem is one of the unsustainability of our present activities. The Brundtland Commission was certainly not the first to bring this message -- sages through the ages have said the same, sometimes with real positive effects on one society or district, and in recent years the Club of Rome, the World Conservation Strategy, the United Nations Environment Programme and others have documented with increasing clarity the inescapable global nature of the collective problem --; but it has been the Brundtland report that has hammered home the inescapable environmental, political, and economic nature of sustainable or unsustainable development, and its relation to decisions.

Politicians, business leaders, marketers and the general public now share a realization that:

- the actions of humans, often individually and certainly collectively, cannot be continued in their present style and scale much longer, because they are contributing in an accelerating way to changes in the environment and planetary resources that will make those same human actions impossible or self-destructive;
- those changes may make human society as we know it very difficult or impossible, not in the distant future, but in the near future;
- through those changes, life itself on Earth may be threatened;
- at the very least, in the short term, unless our present activities are changed, environmental costs and problems will grow and make life and business more difficult.

It is considered by most of those who share this realization that such a danger of impending difficulties or destruction is an undesired thing. Therefore, there is a growing conviction that the environmentally damaging practices and actions of humans should be changed.

It is not really very clear how much of what we do, individually or collectively, is the result making a conscious choice between options, or the result of organizing our actions to move toward a recognized objective - that is by making decisions -, instead of just doing what seems most desirable, convenient, or least oppressive at any given moment. But humans like to flatter themselves as being thinking animals, or at least animals that appear consciously to think ahead a bit more than our fellow creatures on this Earth before making our choices. And thus, except for a few cynics or fatalists, most of us assume that many of the most important actions or practices of humans are the direct or indirect result of conscious decisions. Decisions are of course of all scales of importance and attention: for most of us it was probably a conscious, weighed decision to take a few days from our crowded schedule to come to this conference, but a quite trivial one to decide what seat to take in this room. In the context of the subjects we are dealing with at this conference, we assume that we or someone made some significant conscious decisions, to do some particular things instead of doing something else that might have been done and which might have had different effects on the environment and on the economy, and that these decisions were undertaken deliberately in order to achieve an identified end - to make money, get elected, avoid unpleasant work, etc. - after taking into account the factors known to us and which seem to be important to the decision. The question we want to examine is whether those factors include the effect on the environment and its effect on the sustainability of our activities.

It is easy to get buried in words here. Think of any activity that has a long-term effect on the environment - for example, driving to work every morning:- who is making the environmentally-important decision? Me, when I decide to take my car instead of the bus? When I chose to live in a place where I cannot walk to work? When I made all those little decisions years ago that have given me an office job instead of being a farmer where I would not need to drive to work? Or was it the automobile industry, the transportation planners, or the City Fathers that made the main decisions that result in me being a daily polluter? There could of course be no end to such questions. But behind them all is an assumption that the things we do which have most important effects on the environment are the results of decisions that we make, and thus decisions that we can change.

The consequences of this assumption are profound. This assumption implies that if we make better decisions, we will be able to bring about better practices and actions. It implies further that, at least to a large degree, if our decisions are having undesired effects, we need to change the identified ends or goals of our decisions and to change or widen the factors we take into consideration in making them. And, to quote Jim McNeill, "if we change the way decisions are made, we change the decisions that are made". Therefore, in the light of the enormous problems facing humankind, this assumption leads to the conclusion that we should devise better ways of making decisions, so that our practices and actions will be more sustainable.

--- Or so runs the assumption and the argument. That, it seems to me, is the general reasoning behind having a session in this conference titled "New Methods for Improved Decision-Making". Throughout other sessions in this conference, and the many other discussions and examinations of sustainable development, of economy and environment, and indeed throughout the Brundtland report itself, are many calls for better decisions about resource use, and control of impacts on the environment. What these calls say, in effect, is that what's wrong with the way humans act is the decisions they make.

The Relationship between Decisions, and Actions or Effects

But the problem of improved decision-making may not be as simple as some may wish. If decision-making is regarded as a tool for getting things done, calling for improved decision-making may take on some aspects of hoping for a technological fix. There can be a wishful thinking that if we can only find a better recipe for making our decisions, then the ills and problems of human beings at present living on this planet should become more tractable and may perhaps disappear. But if we follow this line, then we bump into some awkward questions:-

-What decisions?

-Decisions made by whom? for what purposes? based on what factors and weighed according to what criteria?

-What are the options, or the freedom of choice, of those making the decisions?

-What machinery or institutions are in place to implement the decisions?

One could go on with listing such frustrating questions. Think of my earlier example of me being a daily polluter by driving to work. Perhaps a more pertinent questions for today is:

> **Can we identify, in modern society, the kinds of decisions, and the ways that these decisions are made, that can be significantly altered to result in human practices that are less damaging to natural resources and life-support systems of the Planet?**

If so, such decisions would lead toward sustainable development. Sustainable development is a common-sense concept, understandable to nearly everyone in general terms, but, like many widely understood subjective terms such as happiness, health, poverty, etc., open to many definitions and interpretations, as has been clear in many discussions already at this conference. The idea can itself be a contradiction, an oxymoron; it can be pie-in-the-sky, or an attempt to eat one's cake and have it too; or it can be a powerful agenda for discipline, common effort, tough decisions and hard work. If the concept of sustainable development is to have any relevance to the future of humankind, it will require an energetic focus on the third view - an agenda for discipline, common effort, tough decisions, and hard work.

Common sense, and a review of history, also tells us that sustainable development is better for more people, especially future people, than non-sustainable development. Our experience, and the best present economic and resource studies and modelling all seem to show that sustainable development at a level that will give most of humankind a decent way of life should be achievable, but at a price. The price is that most people, perhaps everybody, will have to do things - many everyday things - in a way that will ensure sustainability. If we want to achieve sustainability, and thus to make the changes and pay the price for it, we must make decisions. Society or parts of it, will not be able just to drift into a sustainable state and keep our present habits, our self-imposed values and relationships with one another and with the natural world. There must be conscious decisions to counter or replace the objectives and the practices that lead to non-sustainability. And, so it would seem, those decisions must invoke enough people and their institutions so that the world is changed.

If left to herself, of course, Nature will bring the planet to a sustainable state - that is a state in which there is a continuous dynamic balance involving physical and chemical (including biological, if they are still present) processes. But from all evidence, if we were to give Nature a free hand today, her sustainable state would not include the large numbers of humans that are on the planet at present, and it would not be a state that modern society would find workable or attractive.

Decision-response loops

There are, of course, many kinds of decisions that affect how humans live on this planet, use its resources and affect the environment. Although almost all decisions are inter-related in some way, it is easiest for most of us to think of important decisions in distinct groups depending on who makes the decision and the institutional context in which such decisions are made. For example:

- There are personal decisions, made by each of us individually, which affect not only our own actions but our relationships with others, our reactions within and our influences upon the institutions of which we are part, and our direct and indirect use of resources and our effect on the environment. Many of our personal decisions are also made collectively; and these collective personal decisions affect politics, the market-place, and, ultimately, most of the other types of decisions that affect Nature.

- There are what might be called corporate decisions, made by individual people but intended to guide or influence the destiny of an institution or a business, either in a strategic, operational or inter-institutional sense. These are the decisions for which there is often implementing machinery already in place - to adopt a new technology, develop resources in a specific location, put a new product on the market, etc. - and thus are ones that may have a conspicuous capacity to affect the environment.

- There are government decisions of many types. Although collectively such decisions should, in a democratic country, reflect what the majority of citizens want to see done, governments in general find it necessary to divide the responsibilities and the decision-making processes into categories that are relatively separate from one another. For instance, juridical decisions, having to do with law and justice, are almost exclusively concerned with peoples' relationships and behaviour to one another, or the behaviour of human-created institutions. The legal system strongly affects how humans use the environment, but in most instances, is at a loss to deal with changes to the environment, except as the changed environment causes economic or bodily harm to a person or institution.

- Fiscal decisions are among the most important in their effect on the environment, but the environmental effect is almost always indirect whereas the effect on the economy may be very direct. It is however, proving to be difficult to organize fiscal decisions to promote sustainability. Regulatory decisions are the kinds of government decisions that many people think of first when they consider what should be done to protect the environment from damage caused by current practices. Their usefulness depends upon the recognition of a specific problem that needs control or correcting, the existence of a sound legal basis and machinery for implementation and follow-up, and upon broad behavioural acceptance. With well-developed regulations, decision-making becomes more routine. But regulations of the kind that have evolved in the past fifty years in Western democracies are very hard to apply to broad areas of environmental protection. Regulations affecting the environment can have little meaning unless based in policies that address relative priorities of economic and environmental concerns. Even when such policies are in place, very difficult decisions may be necessary to devise and implement regulations that lead to sustainability of both the economy and the quality and productivity of the environment.

- Another class of decisions, mostly in the government domain, are educational decisions that have to do with the establishment and maintenance of an educational system, with what shall be taught about the environment and its relationship to the economy in schools and universities, and with the development, in young people, of the awareness, determination and skills to make the changes needed to bring about and maintain sustainability. In such an educational system, there are hundreds of decision-making points; and these must be related and made compatible, and put into practice if the next generation is to make sustainable development a reality.

Almost every decision we or others make is of course undertaken in the light of decisions already taken, and will itself have an influence on decisions yet to be made. And those decisions in turn set the stage for still other decisions -- and so on, thus providing a different overall context for new or changed decisions in the areas first considered. Such relationships between decisions and their responses, which lead to and influence further decisions in related areas, may be called decision-response loops. If human actions are to be changed in directions that lead to sustainable development, changes must be made around the entire loop.

There are several decision-response loops into which an awareness of the long-term inter-relationships between human activities and the environment must be injected if sustainability is to be achieved. Some of the most obvious are the following:

(i) What may be called the market-place decision loop links together the decisions made by business and industry with those of the consumer as a monetary actor, with the financial establishment, and with government support and control of business, and manipulation of revenues, at many levels, which lead again to new decisions by business.

(ii) There is a broad but distinctive social decision loop, which includes personal and inter-personal decisions, their relationship to the community and community decisions and activities, and the relation of these in turn to decisions in such areas as welfare, the church, amenities; these decisions, interlinked with the market loop, affect fiscal resources, government facilitation or regulation, and the consequent personal decisions of members of the community.

(iii) There is also, of course, an important political decision loop, concerned with such areas as legislation and all the acts of governance, the maintenance of law and order, national security, the orderly development and implementation of policies in many fields, accountability for public actions, and the processes of securing public endorsement and authority for response to issues that the public feels is important.

Each of these loops, and others that can be identified, interacts with the others; nevertheless, each has its distinctive style of responses to change. Each, at almost all stages, has an effect on the use of natural resources and has an influence on the impact on the environment. Changed decisions in any part of any loop affect all the other decisions. A conscious plan to move toward sustainable development must take into account the need to make changes all around the loops, and the consequences of those changes. Thus, decision-making for sustainable development must be holistic. It must move the whole assemblage of activities toward this goal. It is in part the failure to realize the holistic nature of decision-response loops that leads to a desire for simplistic actions that, some may imagine, will point to a magic road to sustainability. The desire for simple solutions lies behind much of the widespread criticism of the Brundtland Report that it did not indicate clearly what steps should be taken by governments, businesses, and the people to realize sustainable development.

Decisions, Attitudes, and Values

Decisions are of course based on attitudes and goals, explicit or implicit. The decisions themselves can only be taken effectively within an established and accepted social and economic framework. The attitudes will be based on conscious or unconsciously held values, and assumptions that are shared at least between those making the decisions. The goals, in turn, are commonly set through attitudes, shaped or defined through available or perceived opportunities and commonly defined in the framework of existing socio-economic institutions and technology. To demonstrate how these various concepts fit together, think of any present industrial activity, and some recent decision made by its management. What was the decision based on? What were the attitudes brought to the decision taken by management? What are the goals of the management and of the business itself? What is the current social and economic framework within which the decision has been made? What role did opportunity and technology play in the decision? And then, where and to what degree did awareness of the workings of the natural world enter the decision picture?

It is clear that attitudes and desires stem from values held individually or collectively. But they also help to determine values. Our values directly drive our decisions, but usually they react only slowly to changes that may be caused by the consequences of our own decisions. The difficulty that business leaders and politicians have in first accepting and then responding to important changes such as decline of fish stocks or evidence of impending climate change are examples of this. At the same time, there is evidence that the values of society, or at least some active parts of it, when stimulated by an obvious environmental change or threat of change, may be transformed much more rapidly than the institutions through which decisions are made and implemented. The result is, as is often stated, that "the public" may often be seriously concerned about the unsustainability of present practices and policies and be clamouring for change, while the political system and the institutions for making decisions are still locked into "business as usual". Decision-making for sustainable development must overcome this difficult problem.

In considering these issues, it is necessary to resist strongly the temptation to homogenize the human race, and to make the assumption that the same goals are shared by all, that "the public" is a unit, or that the "common good" is good for each person. An important goal must always be to maintain or enhance the ability of different individuals to have, and pursue, quite different goals.

If decisions are based on individual or collective values, shared assumptions, and shared recognition of opportunity, it is important to note that the assumptions shared within one decision-response loop may differ from that of another loop. Each of us probably shares assumptions in the context of one loop that may be inconsistent with the assumptions we share in another loop. Whether or not these shared assumptions are compatible with sustainability has an important bearing on whether or not the decisions made will lead to sustainable development. There are for example characteristic differences in commonly shared assumptions that drive the three decision loops described earlier:-

- market-place loop: almost all participants accept the idea or inevitability of competition, and of profit-seeking; aggressiveness is cultivated; there is a desire for a minimum of imposed constraint and often reluctance to share information or benefits; etc.

- social decision loop:- general acceptance of the need for equity and fairness in dealing with all regardless of their contribution; shared satisfactions; acceptance of obligations to the community; need to curtail aggressiveness and competition.

- political decision loop:- establishment of authority and responsibility; power related to stability; accountability within a hierarchy; individual and national rights, etc.

To the extent that sustainable development can be compatible with such shared assumptions, it can probably be achieved without structural changes in society. But if some of the important shared assumptions within important decision loops are incompatible with long-term sustainability, achieving sustainable development will require significant changes in our institutions and in the way we carry out inter-personal relations.

The Implementation and Manifestation of Decisions

Decisions affecting our future welfare, economic performance, resource use and environmental quality are made manifest in many ways - through laws, policies, changes in the market, commercial investment and management actions, through the educational system, and of course through individual and public preferences and the political response to public concerns. The effectiveness of these decisions is at present judged by a variety of indicators, e.g.:

- national or sectorial economic performance;
- social stability, and various indices of social well-being;
- opportunities for the coming generation.

Such performance is almost invariably assessed in the context of present or acceptable environmental conditions and the current availability of resources. Few of these indicators give warning of environmental breakdown, or a significant change in the availability of resources. Consideration of the implementation of actions or policies leading toward sustainability must therefore give attention to how the different ways that decisions are implemented can be made less vulnerable to environmental change and at the same time provide information about environmental resiliency or significant change in the stocks or availability of natural resources.

Decision-making and the Achievement of Sustainable Development

In considering the decisions that have to be made, or decisions previously made but now changed to achieve sustainable development, it is pertinent to ask what are the goals of sustainable development. What is to be sustained? The productivity of the ecosystem? The production of resources valuable to humans? The socioeconomic system that is dependent on natural resources and the environment? The opportunity for future generations to develop their own needs and wants and to be able to satisfy them?

Each of these, and others, provide legitimate bases from which to approach sustainable development. Each is compatible with the generalized definition of meeting the needs of the present without compromising the opportunity or ability of future generations to meet their needs. But pursuit of any one or some combinations of the above facets of sustainable development could well make it difficult or impossible to achieve the others.

Consideration of these rather philosophical issues brings us face to face with a fundamental question of decisions about sustainable development:-

> **Is sustainable development a concept of human decisions and institutions that takes into account, more realistically than in the recent past, the processes and limitations of planet Earth, with a view toward managing the Earth better?**
>
> or
>
> **is sustainable development a concept in which humans and their institutions make a deliberate attempt to fit harmoniously into the natural workings of the planet, and become functioning parts of the ecosystem?**

In other words, is sustainable development human-centred or Earth-centred?

If the Earth is a spaceship on which are passengers, we know that we have been unruly and often clever but thoughtless and ignorant passengers, who have drilled holes in the structure, raided the galley and caused some damage to the machinery - are we now going to try to become the crew, and to learn to drive it in the way we think we want it to go? Or are we saying that what we really want is to stop damaging our spaceship further, let it run itself as it has always done, and try to take a safe seat for the rest of the voyage?

These different viewpoints lead to important, perhaps vital, differences to our approach to sustainable development. Which view we take will have a lot to do with the decisions we make.

Humbling though it may be for human egos, a little reflection and consideration of our present knowledge of the working of Nature leads almost inevitably to the conclusion that if we wish to continue a safe voyage on our spaceship, we had better not try to drive it all by ourselves. Sustainable development can only be truly sustainable if it is in the long run Earth-centred, not human-centred.

What changes must be made to achieve sustainable development? It is clear that if sustainability is to be realized, it will be necessary to:-

- take into account longer-term effects than is usual at present, and the effects that an action will have on opening or closing of future opportunities;
- take into account influences and actions on a wider range of actors and activities than those of immediate concern or purpose (in effect, the boundaries of concern and accountability become diffuse and greatly enlarged);
- integrate actions and changes caused by humans with the processes and characteristics of the natural world.

What has to to changed in our values and attitudes to make decisions that will lead toward sustainable development? Some of the distinctive elements that need to be emphasized, compared to those that dominate most recent economic and policy decisions, include the following:-

- (i) Increased attention to equity
  - --between sectors of society
  - --across and between regions and countries
  - --across and between generations
  - --between humans and non-humans;

-(ii) Development of a system that rewards sharing of resources, in contrast to one that rewards rights to exclusive use or encourages competition for their exploitation;

-(iii) Accountability, at all stages, to everyone affected
  - --not bottom-line accountability only to owners or supervisors
  - --recognition of the virtual absence of accountability boundaries. How this broad accountability can be reconciled with individual right and freedom of action is unclear;

-(iv) A high value set on prudence in the use of resources and environmental capital, including accounting methods for the appreciation of the potential future value of natural resources, or at least the cessation of the present practices of discounting them;

-(v) Incentive systems that will encourage flexibility of operations and the achievement of an optimum scale and style of activities, and maximum efficiency of total resource use rather than, as is common today, rewarding maximization of throughput and growth of income through maximum sales or service regardless of the wastes produced;

-(vi) Elimination of the non-productive or non-contributing elements of industry, and of the counter-productive aspects of institutions.

What kinds of human practices would be affected by changes to achieve sustainable development? A little reflection will show that changes from short-term exploitive practices to sustainable practices will have to encompass all actions that affect the environment and the use of natural resources.

This means essentially everything that affects the way of life of people in the developed and developing world. The comprehensiveness of the actions and of factors that need to be taken into account is perhaps the most daunting and difficult aspect of implementing practices that are environmentally sustainable. As experience and many studies have shown, it is not possible to move toward sustainable development by simple easy steps while at the same time continuing destructive practices in other sectors of activity. The integration of the environment and the inter-linking of economic practices make pilot or demonstration activities of dubious effectiveness. And yet many present activities, in many parts of society in Canada and elsewhere, are environmentally and economically sustainable and have been for a long period. It is important to identify and recognize these, build upon them and learn from them the way that sustainable decisions are made. Such examples can be helpful in the development of plans and criteria for environmentally sustainable development of our economy as a whole.

Sustainability, in Nature or in human affairs, is a highly dynamic state. It is not a static condition. Thus sustainable development must be a fluid and flexible development. The decisions leading to and maintaining sustainable development must therefore be flexible, adaptive, but consistent.

The Feasibility and Practicability of Making Effective Decisions that will bring about Sustainable Development.

The changes and characteristics noted above as being necessary to achieve sustainability are in many respects contrary to entrenched legitimate business practice and policy formulation in both capitalist and non-capitalist countries. Can they be achieved? Can they be reconciled with the presently accepted need to remain competitive nationally and in each successful business, with the need to be aggressive, to expand the market share or lose it?

Will it be possible to design and implement a smooth turn-around to a sustainable state? Or must the change be violent and traumatic? Who will be the likely victims, who will be the survivors during the transition, if there is to be a transition?

Can some industries, or some countries, move toward a sustainable state without being "clobbered" or killed by others who do not change and who will continue to exploit for the present without considering the future? What kinds of action are necessary to protect those who are making the change?

Can the Canadian economic system remain operating and viable while fundamental changes are taking place in its methods of operation? That is, can we change the bath water without throwing out the baby?

Perhaps, most important:- How can funds for capital investment be raised under conditions of restraint and long-term de-emphasis of competitiveness, and how will tax revenues be maintained?

In the modern world, business decisions and a large proportion of public policy decisions are in the final analysis based on financial viability. Sustainable development requires that the long-term effect on the environment and the potential effect on the welfare or options of future people or people not concerned with the main objectives of the decision must be an integral part, along with financial viability, of the decision criteria. Is it possible to make such changes in the criteria for decision-making and still make financially sound decisions?

Many people knowledgeable and experienced in business and public policy are convinced that these fundamental changes in orientation can be made while still maintaining financial soundness. Because, over the long run, operations in a healthy environment will be more productive and less costly than in a deteriorating environment, much of the problem is connected with extending the period of financial accountability. To do this during a period of rising interest rates will not be easy, but some economists see signs that not to make the change will likely lead to economic as well as environmental ruin. It should be pointed out that other people, mostly environmentalists, repeatedly state that changes to a sustainable economy must be made, but do not seem to have given detailed consideration to how they should be accomplished.

To make the changes to environmentally sound and economically sustainable practices will require careful and deliberate decisions. Such decisions will have to be both incremental small decisions, progressively changing the directions of present practices, and major decisions, which resolutely close off unsustainable activities and implement new ways of doing things. Firm decisions will need to be taken in all major decision-response loops, and it will be necessary to ensure that the actions and the assumptions are oriented toward sustainable development all the way around each loop.

To change the decision-making system is itself a major decision. It must be undertaken while the demand for change is strong and growing. A good example is the decision of the state of Victoria, Australia's largest coal-producing state, in 1988 to implement comprehensive actions that will to reduce dependency on fossil fuels and implement massive reforestation programmes as steps toward meeting the goal of the 1987 Toronto Conference on the Changing Atmosphere to reduce carbon dioxide emissions by 25% by the year 2005. Nor should such decisions be undertaken only when the country or government is financially able to "afford" them. While the immediate loss may be significant, the alternative of not making the change may be seen to be ruinous in the long term. Recent examples of non-wealthy countries making hard decisions in favour of sustainable development are the banning of logging of hardwoods by Thailand, and the decision by Greenland to ration, husband, and re-build its fish stocks in defiance of growing financial pressure from other countries to harvest them.

There can be a variety of reasons behind the decision by society, industry or a government to implement sustainable practices. These can include:-

- Self-preservation - (change now, or go under);
- Ethical and value-driven conviction - (very strong among indigenous people, in Nordic countries, and a major reason why Canadians put environmental concerns at the top of opinion polls);
- Expectation of government forcing in the near future, making it better to change now and keep in control (an important factor in U.S. and European business);
- Capitalization on the opportunity to make a profit, or stay in power, by being first to take advantage of the changed business or political situation.

All of these reasons are present in the considerations being given in many quarters today to the need for and the opportunities provided by moving toward sustainable development. All are legitimate. All of them lead to the conclusion that the sooner changes are made to move the economy onto an environmentally sustainable path, the easier and cheaper it will be, and the better will be the chances for maintaining economic strength and political stability.

Tools for Decision-Making to Achieve Sustainable Development

The different decisions, and different methods of making decisions, that can lead to sustainable development will require new information, new ways of looking at the world and the place of human activities in it. The same new tools that have helped to show that a move to sustainability is imperative will help toward achieving it. Our decisions should make full use of these tools.

Science. Scientific research has in the last few years provided a new understanding and perspective of planetary processes. There has been a joining of physical and biological sciences, and progress has been made in linking these to social and managerial sciences to give a new picture of the role and influence that humans and their institutions have on the regional and world ecosystem. Quantitative studies and mathematical modelling have given a better appreciation of the inter-related rates and scales, in space and time, of the influences of human perturbation of natural processes, and have improved the ability to predict the consequences of present actions. New techniques for resource inventory and environmental measurement, new technologies from satellites to computer simulation to the identification of bio-indicators made possible environmental monitoring with an accuracy and usefulness not previously possible. A number of comprehensive international research programmes are investigating natural and human-caused global changes, and providing the strongest evidence of the need for, and of the progress or lack of it toward, sustainable development.

Environmental Assessment. Canada and most other developed countries have implemented formal procedures for assessing the environmental effects of proposed development activities. In Canada, both federal and provincial systems are evolving and adapting to meet changing needs, and different public and political pressures. An important trend in this evolution is toward inclusion of longer-range and broader effects. The procedures presently in place still have a number of problems:- they are for the most part designed to deal with one project at a time; they may lack comprehensiveness or authority; they often include a lot of "low-grade science", and they are sometimes accused of being unnecessarily expensive, inefficient and subject to bias or pressure. But environmental assessment and review is the strongest and most important institutional tool in decision-making toward sustainable development.

In addition to the formal processes of environmental assessment, informal processes of assessment carried out by industry, public groups, and a variety of government agencies are increasingly sophisticated and valuable in identifying and evaluating the sustainability of present or contemplated activities. These activities are at present perhaps taking the lead in exploring the various economic, institutional and environmental parameters of sustainability.

An organized scientific approach to identifying some of the characteristics and problems of sustainable development is provided by the Canadian Environmental Assessment Research Council, or CEARC. CEARC is a unique institution, a federally-funded independent body dedicated to improving the concept, craft, and usefulness of assessing environmental impacts and effects. It is currently exploring a number of areas vital to the assessment of the environmental sustainability of economic development - areas such as the assessment of cumulative impacts, of the relationship between environmental impacts and social factors, health, economic analysis, and the environmental assessment of government policies. A current project is investigating the connection between environmental impact assessment and sustainable development programmes in Canada.

Resource Assessment and Integrated Resource Management techniques provide important tools for decisions on sustainable development, by providing inventories of resources and assessment of net economic or social values under different conditions of exploitation or management. In many developing countries, techniques related to resource assessment provide the main basis for development planning. They also can provide the information needed for relating changes in environmental conditions and resource availability to social values, and for examining the probable effect of potential management actions, such as changes in water pricing, or the imposition of a carbon tax, on the sustained value of the resource. Integrated resource management also provides a method for taking into account the value and cost of protected areas in land use planning, and for assessing the potential value of changes in biological diversity or gene pools.

Operational techniques. A number of techniques developed for management and operational purposes also have a place in setting the stage for making decisions with respect to sustainable development. These include methodologies for demand management, and the problems of relating sustained demand to variable supply; futures forecasting; media and marketing techniques, etc. Each has a role in bringing about the changes in attitudes, values, and assumptions essential to identifying the possible viable options for sustainable development and making and implementing the best decisions among those options.

The need for judgement. Today's decisions regarding management of resources, protection of the environment, and meeting social and political needs are so complex that, in the absence of widely accepted over-riding moral principles guiding the present behaviour and future hopes of society, it is necessary to fall back on a number of so-called objective technologies. Examples of such technologies are different types of systems analysis, futures studies, model simulation, expert systems and artificial intelligence, etc. These technologies can take into account and evaluate more factors than human intellect alone; but they must do it according to pre-selected criteria. They are essential aids for decision-making in the operations in large corporations and government bureaucracies. They thus have a place in the development of decision-making systems for sustainable development. However, use of such technologies tends to lead to decisions that are driven by the available information, rather than decisions based on the best human judgement. They tend to perpetuate the system that set them up, and as such may not provide the best basis on which to promote and manage change. It is important, in making decisions that will lead to the major changes necessary to achieve sustainable development, that such decisions are based on the best judgement and informed imagination, and not only on mechanical programme techniques or available data.

Major Problems in Making Decisions for Sustainable Development

Lying behind the technical and judgmental aspects of decision-making to achieve the generally-accepted "common-sense" goals of sustainable development are a number of deeply rooted viewpoints and habits, as well as economic practices, that stand in the way of making responsible decisions in a "sustainable" perspective, and which make it difficult for the decisions to be understood or willingly accepted by all those that will be affected. The problems presented by these viewpoints and habits make it all the more important that careful attention and planning be given to the way that decisions are made to move the whole set of decisions in a "decision loop" into a sustainable mold. The difficulties should not be under-estimated. Some of the important ones are the following:

> The present system of decisions and goals is well entrenched, and is resistant to major change. To many managers and decision-makers, in North America particularly, the present system is all they know; it is perceived as normal, and it is hard for many managers to entertain any serious thought that other systems and values can be economically viable, despite the evidence from other parts of the world and from history that other systems of decision-making also work well in satisfying human needs and keeping a nation "in business". This entrenched viewpoint, even in the light of the compelling evidence of the need for major change, results in a temptation to attempt to make minor changes at the margin of socio-economic activities, but in all important areas to continue decisions and actions as they have been in the recent past. There is a danger that such thinking will defeat the purpose of any changes attempted, and make impossible the achievement of sustainability.
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> A dominant characteristic of the entrenched decision-making system is short-term focus on results and accountability. Such a focus puts a premium on maximizing consumption, on through-put of materials and resources, and places handicaps on attempts to achieve greatest net efficiency and minimal waste. It almost always leads to under-valueing common-property resources and the discounting of future costs or benefits. In these ways, a short-term focus for business and policy is inimical to sustainability.
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> The adversarial legal system under which the present behaviour of society is controlled is based largely on precedents of conflicts between individuals or institutions, and is poorly suited to deal with protection of Nature or of the rights of others, living at a distance or yet to be born, before they suffer damage. An important part of the changes needed to achieve sustainable development will be to develop, in a responsible way, innovative and co-operative law that can supplement but not replace the present adversarial system. Most calls for sustainable development from the environmental

groups and even from the Brundtland Commission put great trust in the ability of humans and different interest groups to co-operate for the common good in both the short or long term. However, human history seems to show that people and their institutions co-operate best when there is a law or other authority that makes it advantageous or imperative for them to do so, and which protects the co-operating or well-meaning actors from the fickleness, maliciousness or simple greed of others. Sustainable development is not likely to be achieved in any significant way unless a supportive body of law, with appropriate juridical decisions, is developed as an integral part.

A major problem of a somewhat different nature is the tendency for growth of unrealistic expectations in the move toward sustainable development. In the literature and discussions about sustainable development there are many statements that appear to be rhetoric, hyperbole, or wishful thinking. The state of sustainability is sometimes portrayed as one of stability, of social equity and national integrity over time. It seems at times to imply a homogeneous society, or at least one where excesses are avoided and every citizen and corporation exercises constraint for the common good; where there will be "fairness with competition", and everyone will be a winner, including the environment itself. This Utopian view of sustainable development seems to pay little attention to the brutal facts of geographically uneven distribution of resources, the significant differences in environmental harshness and biological productivity of different parts of Canada, the quite different value systems of different sectors of society, and the wide ranges of enterprise, ability, energy level, and priorities among people. It may be that the over-simplistic Utopian light in which sustainable development is often portrayed is itself a major obstacle to serious consideration of the concept by persons in responsibility who know what difficult decisions will have to be made to start down that path.

The achievement of sustainable development however it is defined, challenges directly some of the most cherished sacred cows of our society. Some of these sacred tenets are in the light of present scientific evidence patently unsustainable or unsupportable; but they are rarely openly questioned because they are part of the moral, religious and ethical background of our culture. But endorsement of the concept of long-term sustainability brings these tenets into the open, where challenging them, or alternatively turning a blind eye to them, calls for difficult decisions by individuals and society at large. Some of these "sacred cows" are:

(i) the tacit agreement that human biology and biological instincts are outside the realm of socioeconomic and sustainable development planning. We manipulate these biological facts and instincts all the time in our marketing and advertising, of course; but somehow the intervention into affecting the numbers of people being born is by tacit agreement not a part of development planning.

The burgeoning human global population is taken as an uncomfortable and largely uncontrollable "given" or even a wild card in the deck of human issues. Although it is little discussed, there is wide acknowledgement that the growth in human numbers, in not only the developing world but also in the industrialized world where each additional person contributes more to environmental stress is the most important single cause of problems in achieving sustainability. And yet human biology and what to do about the growth of population is by and large "off limits" to planning and decision-making for sustainable development.

(ii) The concepts that all humans are equal, and all human rights take priority over the "rights" of any other form of life, are another "sacred cow" that becomes hard to justify in all cases leading to sustainable development. That each human has the same basic rights is of course the only justifiable basis for an enlightened society. But equal rights does not necessarily mean unlimited freedom to exploit fellow humans and the environment. The pursuit of sustainable development crosses the boundary from the area where humans are best served by each individual and acting in her or his own interest with a minimum of imposed restrictions, into the area where there must be common action for the common good. The concept that all persons are equal regardless of the contribution they make to society may be severely tested in this transition. From a decision-making point of view, is it necessary to decide on equality or equity, to allocate rights? If so, who decides, on what criteria? From here, it is just a step into the thorny thicket of the "rights" of non-humans to be able to exist with a minimum of interference from humans.

(iii) A third somewhat related traditional "sacred cow" that is being challenged by sustainable development is the idea, inherent in several of the major world religions, that planet Earth was somehow made for the use and convenience of Humankind. Throughout the ages, clear-thinking people have pointed out the egotistic fallacy of this idea; but the concept lies behind most of our economic and social institutions today and is a background reason behind many of our present environmental problems. This "sacred cow" is now being openly challenged, and disposing of it will be a prerequisite to achievement of sustainable development.

Some of the major problems that lie in the path of achieving sustainable development have been placed there by Nature herself or by Nature in response to recent human intervention. These natural factors change the kind and timing of decisions that have to be made to re-orient society toward sustainability. They may limit the choices for moving toward sustainable development and set the priorities and agenda for both short-term and long-term action. The dynamic and sometimes unexpected behaviour of Nature therefore has an important control on the decisions that can or will be made. Examples of natural factors, mostly in response to human action, include some obvious major problems for sustainable development:-

- climate change, and associated likely change in world-wide sea level;
- the dwindling of the world's forests;
- decline in soil fertility in many parts of the world;
- toxic contamination of groundwaters and streams;
- "ecological surprises", when an ecosystem becomes progressively stressed beyond its natural resiliency and reverts quickly to a new state. (An example might be the rapid change in composition of fish stocks in several marine areas.)

A final major problem in achieving appropriate decisions for sustainable development is the institutional question of how to make anticipatory decisions toward bringing about or taking advantage of a new state of affairs. Business and government give a lot of attention to planning and forecasting, but almost entirely within a given and assumed continuing institutional and environmental framework. We have less experience in developing the alternative scenarios and weighing present costs against future costs and benefits that will take into account the effects of natural change, biological evolution, or changed human values. But there is some experience in making decisions well in advance of the expected efforts or results, that can be valuable in moving toward sustainable development. The establishment of National Parks and Biosphere Reserves; the development of an ecosystem effects basis for protecting the environment of the Great Lakes under the International Joint Commission; the Antarctic Treaty with its international conventions on conservation of living marine resources and on minerals; and the Montreal and Helsinki accords on control of substances that destroy the ozone layer are all examples of decisions that change the way we do things or value things, made in advance of the serious emergence of the problem itself. We should build on these and similar experiences in our attempts to design a sustainable world.

Characteristics of a Successful Decision-Making System for Sustainable Development

A successful decision-making system that will lead society and economic systems toward sustainable development will have the following characteristics:

(i) **Information that relates or integrates natural processes and human activities.**

- Such information must incorporate an understanding of natural characteristics and phenomena and an awareness of the variety of human needs;

(ii) **A measurement or monitoring system** that responds to variation, yet is consistent, and accessible to all;

(iii) Societal or institutional goals or objectives that relate human needs to knowledge of the natural world and the workings of the socio-economic system;

(iv) the **authority to implement the decisions**, reward their successful accomplishment, and to punish or increase the costs for those who don't.

Perhaps the best example of a successful decision-making system that achieved sustained environmental productivity and economic development over an extended length of time is also one of the oldest. The Nile River valley was actively and successfully managed from about 2400 B.C. to around 1100 A.D. During that period, despite vagaries of climate and the vicissitudes of wars, religions, and dynasties, this extensive region, more than 2000 kilometers long, remained productive and wealthy. The key to Egyptian prosperity was an environmental information system based on the height of the Nile at Aswan and at other key points downstream. On the height of the river at certain dates, was set the rate of taxes, the percentage of the current years' grain crop that must be set aside for seed, and the schedule of planning great construction works and military campaigns that employed labourers displaced from their fields during the flood period. Such a sustainable development decision system showed an awareness of Nature and her variabilities, an ability to plan ahead based on expected productivity and hold reserves for poor periods; it depended upon decisions made within an administrative system that operated on national and local scales tied to an open and accessible environmental information network, impartial and publicly visible accounting, and the authority and communications network to enforce the decisions. History shows that the system worked, for more than thirty centuries.

A successful decision-making system for sustainable development has several other characteristics:

- In setting priorities, it must put future needs first;
- The maintenance of environmental productivity must take precedence over the desire for abundance beyond basic needs;
- The ripple effects of an activity must be known to and accepted by the public;
- The "level playing fields" of economic planning and operation, which are necessary for effective competition within industry, necessarily become progressively smaller as freedom for unfettered action is inevitably constrained by environmental and resource limitations.

The Changing Context of Planning and Decisions

The implementation of a system of sustainable development, far from being a peaceful Utopia or alternatively a Brave New World in which an absolute authority tells everyone else what to do, seems likely to be a very turbulent and exciting state, with a premium on knowledge, and an awareness of a range of options or actions. It must become a world in which nearly everyone is involved in decision-making and admits some responsibility not only for her or his own actions but for the effects on others. It will likely be a world in which we can expect :-

- more government and public scrutiny and control, especially at early stages;
- reduction of subsidies, less support for the unfit or unsuccessful enterprises;
- more volatile, less stable business, perhaps with continuing high interest rates, and wide ranging varying policies;
- more local controls, and also more local freedoms;
- more living off costs, more individual responsibility for the future, less "insurance" at public expense;
- a chaotic life for all;
- a return to real "democracy with authority"?

Likely, in such a chaotic world, the vulnerability of each nation or enterprise to foreign intervention and upset, as well as to natural changes, will not be less; but be overcome by the most able. More of the "unfit" may fail.

If this scenario is right, sustainable development will not be a benign state. It may be more ruthless than we have been accustomed to in North America in recent decades. It is well to bear in mind that sustainable development is not a static situation; - it must be dynamic development; - a continuing journey, not a status to be arrived at. The journey will require continuous decisions all along the way.

NEW METHODS FOR IMPROVED DECISION-MAKING

Bill Harper

General Manager, I. D. Systems Ltd.
905 Waverley Street
Winnipeg, Manitoba R3T 5P4

ABSTRACT

Land use planning was a very labour intensive process, in the past, which required hand-drawn overlays to identify the relationship between constraint and the suitability criteria. The process demanded that all data bases be manually standardized to scale. Any changes usually meant new maps or overlays to be drafted. Accuracy of this process was not high; for large areas, the number of maps became cumbersome and point data was either left out or drawn in as density polygons.

This type of planning often resulted in "the best you can get under the circumstances" with the hope that problem areas could be refined with more intensive site data.

Today, these and other problems can be overcome through the use of desk top geographical information systems such as TYDAC Technology's Spatial Spatial Analysis System (SPANS). This system and others allow the planner to: develop a consistent, coherent data base using maps of various scale in printed or digital form; feature files which can be updated; obtain a high degree of accuracy where errors do not reoccur; permanently record decision-changes; and access automatic calculations for quantitative analyses.

In the past, land use planning of multiple resource use areas was a very labour intensive process involving hand preparation of base map overlays used to develop constraint maps and suitability maps. Any changes in selection or constraint criteria, resource bases or ranking usually resulted in the redevelopment of several overlays. The accuracy of this system was not high and all areas had to be hand measured with a grid or planimeter. Data bases had to be standardized to a common scale either by hand or photographically. For large areas, the volume of maps became cumbersome. There were also problems presenting data in reports.

Point data was either left out or hand drawn in as density polygons by planners' "best guesses" for size and shape. Some data and information bases could not be directly incorporated as physical features because of format so planners "considered" these data and factored them into the analysis as best they could.

In the early 1970's, the Province of Manitoba and others attempted to use large main frame computers as planning tools. Access to these computers was limited, expensive, somewhat time consuming and usually restricted to pilot projects wherein the planner had to depend upon a handful of computer experts who sometimes knew very little about land use planning. This phase of electronic planning faded for a number of years until affordable personal computers came on the market.

Jumping from that period to today, almost all of the land use planning problems can be overcome with the use of desk-top geographical information systems (GIS) which use personal computers.

I.D. Systems Ltd. uses a GIS called SPANS. It was developed by TYDAC Technologies of Ottawa to overcome a multitude of problems facing today's land use planner.

Some capabilities and features of this new planning tool are:

- an easy to use key-word menu
- accepts common map projections (UTM, Lambert Conformal Conic, Polyconic, Transverse Mercator and others)
- efficient data structure (can store up to 1,000 maps on a 30 mb hard disk)
- overlays up to 14 map themes at a time
- offers complex point and area modelling functions
- accepts areas, lines, and points from digital and analog sources; generates corridors around lines and circles around points
- interfaces with other GIS's
- produces map contours with point data
- stores maps in an "atlas" for fast retrieval
- provides high and variable resolution (up to 1/33,000th of any map universe)
- uses windows to zoom in on images
- produces overlays in minutes
- produces statistical reports on overlay results
- prints maps or text on dot matrix, laser, inkjet and line-plotting equipment

The public, and in my business the client, demands quantified accuracy in resource planning, site selection or linear selection planning. We feel that this new system offers an improved method for environmental decision-making that can withstand public and government scrutiny. We have tested this technique in public and on government programs and found it to be an excellent tool.

TITLE: New Approaches to
Resources Allocation and
Utilization
SESSION: A.3
BULLETIN NO.: 6

FRANK GAFFNEY

Mr. Gaffney focused on the need for conflict resolution in resource management. Conflicts can be resolved by the stakeholders if they are willing to negotiate and reach consensus, he said. The Northwest Renewable Resource Centre, has brought together environmental groups, tribal councils, resource management groups, government, and citizen organizations to achieve the Timber, Fish, and Wildlife Agreement. It has been followed by changes in legislation and regulations.

"Too often resource management conflicts end in litigation," said Gaffney. Although this may decide the outcome, the process is too long, costly, and in most instances does not resolve the underlying issues. "Communication is a critical element in the bargaining process," he said.

Resource management conflict resolution is moving into a new phase, where the stakeholders are seen as holding the solution to the problems.

DR. GERALDINE KENNEY-WALLACE

Dr. Kenney-Wallace stated that the key points for a sustainable development strategy were: people; ideas; opportunities; markets; capital; timescales; and the environment.

An understanding of environmental issues, and our relationship to each other and the planet must be achieved. Lifelong learning, training and re-training are critical issues.

Ideas are essential if we are to deal with environmental issues creatively. Long term research, and consortia, where companies can collaborate on development prior to entering competitive phase is needed. There is need for a long range vision, not short term quick solutions.

Research and development is an investment in the future. There is a global market for environmentally sound products. Dr. Keeney Wallace used as an example, the bio-degradable crop protection shields, developed in Canada using polymer structure technology.

We must regard the environment as capital and resources must be allocated carefully, to avoid an environmental deficit. We must adopt a risk start approach, investing in environmental technologies. We must achieve a balance between our economic and environmental rhythms.

NIGEL RICHARDSON

Mr. Richardson's address linked land use planning to the issues of sustainable development. He said, land use planning, implies the use of resources both under and over the earth's surface.

The aboriginal peoples had a broader view of land and its interrelationship to resource use he said. They can be a major contributor to achieving sustainable development policies.

Land use is controlled by many departments and agencies of government, said Richardson, and all of them have a different perception of what the reality is. He paid tribute to Manitoba, for having a broader vision of an effective planning strategy. Richardson said that earlier concepts had linked planning to conservation strategies and rural development.

To be effective, land use planners should adopt the adage "think globally, act locally" he said, adding that land use planning is a tool, and the key to achieving sustainable development.

Broad based policies, criteria and guidelines need to be developed, he said, not detailed centralized planning.

"With the growing climate of concern about the course of spaceship earth, we will come to realize that land planning is essential to our survival," concluded Richardson.

ISSUES FROM THE FLOOR

. Dealing with the larger issue of the global commons such as the ozone layer and oceans.
. Need for a trigger mechanism in a dispute, and to identify role of the mediator.
. Need for protection of ecological systems.

ENVIRONMENT & ECONOMY - PARTNERS FOR THE FUTURE

Frank L. Gaffney

Northwest Renewable Resources Center
710 Second Ave., Suite 1133
Seattle, Washington 98104

Good Morning!

On behalf of the Board of Directors and the staff of the Northwest Renewable Resources Center, I want to thank the Government of Manitoba for the opportunity to participate in this conference. I am going to talk to you today about natural resource conflict, and how many people we have worked with were able to resolve those conflicts in a win/win fashion.

I do want to make clear that I bring you these examples of mediated negotiations to simply acquaint you with a process, not to tell you how to conduct your own affairs. In fact, any resemblance between the American case studies I will cite, and similar Canadian natural resource conflicts, living or dead, is purely coincidental. Likewise, any negotiated agreement is simply a result of accommodation by the people involved and those issues which they chose to deal with. In that regard comparing agreements may be an interesting academic exercise, but practically, serves little purpose. But first a few words about the Northwest Renewable Resources Center.

NRRC was founded in the spring of 1984 in Seattle, Washington by leaders from industry, the environmental community and the tribes. Originally conceived by Seattle attorney Jim Waldo, the NRRC provides a forum for the discussion of natural resource issues before they reach "critical mass." NRRC also has an Advisory Committee whose members represent the same constituent groups as the Board, namely industry, the environmental community, tribes, academic community and local government. The Advisory Committee recommends "issues" to the staff as potential projects, those issues are researched by staff and assessed for their viability as projects and then submitted to the Board for further discussion and approval. In addition, the staff provides mediation and facilitation services in conflicts arising over natural resource use and management. Some requests for mediation assistance come directly to the staff from outside organizations or agencies, but all projects undertaken must be authorized by the Center's Board of Directors.

Conflict is "normal." We all experience conflict in every area of our daily lives. Natural resource decisions often lead to conflict because those decisions may be irreversible. These conflicts traditionally have been resolved through a legislative or regulatory process. These processes generally consist of confrontation followed by compromise. Reaching accord is difficult because decision-making mechanisms are so different. Government and industry tend to make decisions based on technical and economic considerations. Citizen and conservation groups tend to make decisions based on environmental and social considerations. Government and industry have vertically structured chains of command. Conservation groups and tribes tend to have a lateral or bottom up decision-making process. Interactions are formal, usually through prepared testimony. This means we tend to see each other at our worst, advocating extreme positions to influence others. This system also fosters little respect or trust between conflicting parties.

Litigation is also commonly used to resolve natural resource conflicts, and in some cases, it is the only way. However, it is expensive and can exclude those who cannot afford it. It often takes too long, and legal outcomes deal with effects of disputes, not their symptoms. Finally, legal decisions must usually be implemented by others, which means more time will be required before any changes take place on the ground, even if you "win."

Conflicts over the shared utilization of natural resources are usually distinguished by several common characteristics:

1. All have been marked by long-standing and often bitter controversy. In a number of instances, the battles themselves have taken on more importance to the parties than the resources at issue. These battles have resulted in win/lose outcomes.

2. The people most interested in the outcome of these conflicts had stopped listening to one another. Many were guilty of predetermining how their adversaries were thinking, and then taking actions accordingly. Instead of communicating about their goals and needs, they attacked what they assumed were the opposing positions.

3. Administrative and legislative bodies oftentimes base decisions on the strength of the advocate, not the merit of the presentation, thereby encouraging posturing and positioning instead of candid discussion of the issues.

4. Many people have held the opinion that each conflict was just another skirmish in a war that would go on forever. With no end in sight, there has been little incentive for trust, creativity, or finding lasting solutions.

NRRC has intervened in a number of policy negotiations in the role of mediator. The technique we have used in these negotiations is adapted to the specific circumstances, but generally has the following features:

- Negotiators are asked to identify the needs of their constituency and to share them with the other parties.

- Ground rules are adopted wherein the parties agree to respect the needs of others and in turn can expect their needs to be respected.

- All issues identified by the parties are dealt with by the group.

- No votes are taken. All decisions are made by the consensus of the entire group.

- Anyone may leave the ground rules and the negotiations at any time, but they must stop long enough to allow the other parties the opportunity to resolve the problem.

- If the negotiations are successful, all parties agree to be advocates for the agreement.

The first project undertaken by NRRC in 1984 was called the Joint Management Project. In 1974, a federal judge ruled in U.S. v. Washington, that certain Indian Tribes, when signing treaties with the U.S. government in the mid-19th century, reserved to themselves the right to catch up to 50% of the harvestable salmon and steelhead returning to their usual fishing grounds. (This ruling is commonly referred to as the Boldt Decision.) The reaction of the non-Indian fishing community was immediate and predictable. The decision was appealed but ultimately was withheld by the U.S. Supreme Court in July, 1979 with little modification. The focus then shifted to the Congress for the next several years as efforts were made to abrogate some or all of the tribe's treaty rights to fish. These efforts also failed, but the tribes through it all were not pleased with their situation. While they were winning in the courts, tribal fishermen were losing where it mattered: they were still getting very few fish. This resulted in part because the court decisions had to be implemented by state fisheries managers, who still thought they were going to win. Each court victory was very expensive for both sides, with little measurable result.

At the request of the State of Washington, NRRC intervened in the fisheries dispute in the spring of 1984. Beginning with a meeting of 40 tribal and state fisheries managers, and over the next six months, NRRC assisted the parties in developing a system of communication and joint fisheries management. Consider these numbers: In calendar year 1983 there were sixty some separate legal actions between the state and the tribes over fish. In 1984 there were none. In 1985 there were 6. The total has never reached double figures in any succeeding year since NRRC intervened. These parties routinely cooperate today without the Center's assistance.

Using this method in Washington state during the Timber/Fish/Wildlife negotiations in 1986/87, NRRC was able to assist the negotiators in revising forest practices regulations for all state and private land. But the real changes came in the manner each of the groups began to listen to and react to one another. Included in that project were representatives of four state agencies, 26 Indian tribes, several large industrial timberland owners, plus their association, the Washington Forest Protection Association, the Washington Farm Forestry Association, representing small woodlot owners, National Audubon and the Washington Environmental Council. They had a fifteen-year history of conflict over forest practices and were gearing up to do battle again. Instead, NRRC facilitated approximately 100 meetings in six months until the negotiators reached a final agreement. The agreement provided for a system containing much greater flexibility based on site-specific decisions, or you could operate solely under the regulations. Cooperative research and monitoring would provide the basis for future changes, instead of playing dueling scientists in front of the Forest Practices Board and the Washington Legislature. In the end, the changes were approved by the Forest Practices Board after state-wide public hearings and funded by the Legislature. Implementation has not been easy, but it is working, and all involved have applauded the agreement as a better way of doing business.

In the spring of 1988, NRRC was contacted by Idaho Governor Cecil Andrus. A negotiating team had been working for over three years to develop a non-point source pollution implementation policy for mining, agriculture and forest practices. Negotiations had broken down, and the Center was asked to intervene. The negotiations had been facilitated first by a state agency employee and later by a member of the Governor's staff. Both processes broke down and resulted in two different pieces of industry supported legislation being vetoed by two different governors. Quite frankly, politics prevented these people from coming together. Normally, I would tell you that there has to be some level of willingness to negotiate, in order for this process to be successful. However, in Idaho that was not really the case. To convene the negotiators, the Governor had vetoed an industry promoted bill to resolve this issue, and he had asked several environmental groups to stay a lawsuit filed because of the legislation. He asked both sides to submit their "ideal version" of regulations to resolve the issue and began to promulgate both sets of regulations. His hope was that the negotiators would develop a third, consensus set of regulations through negotiations, which would be substituted for the two opposing versions. He also told both parties that if either of them pulled out or failed to bargain in good faith, he would implement the other side's regulations. This was obviously a "shotgun wedding" at best. And, in fact, the first two months of this process were spent trying to convince the industry negotiators to really negotiate. But in the end, we were successful in getting everyone to the table.

After a total of 15 meetings, agreement was reached. The negotiators held together as a group during a difficult session of the Idaho Legislature, and the agreement is now law and being implemented. Again, it was the first issue of its kind resolved in Idaho through mediated negotiations.

The most recent Center project took place in Alaska last winter where we assisted the state, environmental and fishing groups, and the timber industry go through a review of the state's forest practices act. Again these parties had a long history of conflict, and the negotiations were quite difficult.

Ultimately, thirteen out of fourteen parties agreed to the revisions hammered out over five months of meetings. The Alaska Loggers' Association (A.L.A.) declined not because of substance, but because of the potential effect revisions to the state act might have on federal lands. In the end, Governor Cowper elected to introduce the legislation without the support of the A.L.A. It was, however, introduced so late in the session that it failed to pass. The negotiators are expected to reconvene this fall and reintroduce the bill next session.

So what can I leave with all of you here today? Well, to quote Bob Duncan, Chairman of the Northwest Power Planning Council, "Cooperation leading to small but significant progress is always more difficult than angry confrontation that produces nothing."

Certainly the professional and personal relationships growing out of the T/F/W negotiations and the others that I have mentioned are a permanent lasting benefit, more important than any of the words or regulations.

Our society has tended to view negotiations as a last resort. When you are down to your last silver bullet and your opponents are closing in, it must be time to negotiate. It is risky to agree to sit down and listen to and be honest with your adversaries. But under the right conditions, negotiations can unlock the collective creativity and flexibility of those at the table and provide lasting, reasoned, consensus answers. On behalf of the Northwest Renewable Resources Center, I thank you for inviting me, and I wish you the best of luck in your discussions for the future of Canada's economic growth and healthy environment.

RENEWING AN OLD APPROACH: LAND USE PLANNING AS A TOOL FOR ACHIEVING SUSTAINABLE DEVELOPMENT

Nigel H. Richardson

Principal, N.H. Richardson Consulting
203 Old Orchid Grove
Toronto, Ontario M5M 2E6

Although this panel is supposed to be dealing with new approaches to resource allocation and utilization, I am going to be talking about an approach which in Canada dates back more than two centuries, at least to King George III's instructions to Governor Murray following the Treaty of Paris in 1763.

Land use planning has to some degree left its mark on the history of Canadian settlement ever since. By the beginning of the present century, it was becoming quite widely recognized and employed in a rapidly urbanizing society. In 1909, the federal government appointed a Commission of Conservation which soon afterwards engaged as its adviser Thomas Adams, the founder of the British Town Planning Institute. In 1917, the Commission published Adams' landmark report on Rural Planning and Development. In 1989 much of this report still remains pertinent, and there are passages which indeed anticipate the reports written seventy years later by the Brundtland Commission and our own National Task Force on Environment and Economy.

There can be no doubt that if Thomas Adams were alive today, he would be a leader of the sustainable development movement. As the dominant figure in the modern era of Canadian land use planning and the first president of the Town Planning Institute of Canada, he would certainly take it for granted that land use planners would be in the forefront of that movement. Instead, land use planning in Canada in the era of Brundtland and the National Task Force has to a very large extent become merely a branch of municipal administration and a technique sometimes employed in the management of public lands.

There are many reasons for the relegation of land use planners to such relatively humble roles, including the effects of two world wars and a Depression, but I would like to draw your attention to three in particular.

First, as land use planning in different forms has been adopted by municipalities and government departments to serve their particular needs, the paradoxical consequence has been to identify the process (and its practitioners) with those specific limited applications, and to diffuse and obscure its broader potential.

Second, although terms like strategic planning have become catchwords in the private sector, in this country any form of real planning in the public sector remains suspect. It is disliked by politicians in particular as a constraint on their ability to improvise decisions in response to immediate demands.

Third, and most fundamental, is the general perception among North Americans of land as private property and commodity, exemplified by the common assertion that "you can't tell people what they can do with their own land". The notable exceptions, of course, are the aboriginal peoples, whose perception of land and of their relationship to land has always been entirely different. The gradually dawning "scientific" view of land as one element of an ecosystem of which humanity is also a part is one which our aboriginal compatriots have always taken for granted, but it is not yet widely accepted among the rest of us despite the growing public concern about "the environment".

In spite of these handicaps, land use planning has accomplished enough in Canada to justify my claim that it can be a major contributor to the quest for sustainable development. Through planning, wasteful and uneconomical use of land and resources has been curtailed, different and potentially conflicting uses have been enabled to coexist harmoniously, and sustained use of renewable resources has been fostered. Through land use planning, areas, resources, and features of unique or special value have been protected. Environmentally benign economic development has been facilitated and environmentally harmful development has been controlled. And planning is contributing in a variety of ways to promoting that rather neglected aspect of sustainable development, sustainable urban development.

I am not, of course, trying to persuade you that all these good things have been achieved successfully and consistently across Canada. Would that it were so. The regrettable fact is that the number of notable successes is at least matched by the glaring failures. But I would argue that by and large, the failures are not due to the inadequacies of the tool so much as to the misuse -- or non-use -- of it.

Nor am I trying to represent land use planning as a panacea, a magic formula that can somehow create a sustainable society all by itself. That is certainly not the case. What I do assert is that there is ample evidence across this country to show that land use planning can do a great deal to help us along that road.

Having said that, it is probably time I explained more specifically what I'm talking about. If land use planning isn't just a matter of zoning a city or a tract of Crown land, what is it?

What it is not, to begin with, is a sort of standard technical formula with which you can program your computer to produce instant solutions. Land use planning has indeed been called simply a point of view, and there is much truth in that definition. It can also be defined just as the application of forethought to the use of land, and that is equally valid. But let's think of land use planning a little more precisely as a process which involves certain specific steps or elements.

In essence, like any other kind of planning, land use planning is a matter of deciding where you want to get to, and then figuring out how to get there, taking into account both where you're starting from and what you're likely to encounter along the way. Since this is not an introductory course in planning school I'm not going to elaborate on the particular characteristics of the land use planning process, but let me just mention a few of its key features: comprehensiveness; anticipation of future conditions; continuity over time; a systematic but flexible approach; and broad participation.

I do, however, want to elaborate a little on the most fundamental feature of all, because it is the key to the contribution of land use planning to sustainable development.

The very word "planning" implies a purpose or an end to be achieved, what I referred to a moment ago as "where you want to get to". This is usually known in the trade as a "goal". Quite simply, if you're going to plan you have to know what you're planning for.

While the goals of land use planning are nevertheless not always clearly defined, they can usually be identified, as, for example, the ability to provide public services economically, or to achieve maximum economic return from the use of Crown lands, or to create a more livable urban environment. The nature of the goal will determine the direction and the eventual product of the entire land use process.

Since land use planning is really only a tool for attaining a goal, the key to employing it in the service of sustainable development is to establish sustainable development as its goal. This may sound simplistic, but it cannot be over-emphasized that the potential of land use planning will only be realized if governments, as a matter of policy, explicitly define sustainable development as the goal of land use planning or at least as the fundamental criterion against which all land use plans must be measured.

Of course, this is by no means the end of the story. Having established sustainable development as the goal of land use planning, we then have to look at the practical measures needed to enable land use planning to be employed effectively to achieve it, and we have to identify the obstacles to those measures.

The first thing we discover is that for practical purposes the word "land" has no generic meaning so far as governments are concerned. I always think of a version of the parable of the blind men and the elephant. In my version, the elephant represents our land resource, and the blind men are variously labelled "municipality", "Department of Agriculture", "Department of Environment", "Department of Highways", "Department of Natural Resources", Department of Industrial Development", "Provincial Hydro" and so on. Each blind man defines and uses his particular bit of elephant in accordance with his own perception and interests. There are an awful lot of blind men, most of them in provincial hats but some wearing the federal maple leaf.

So the next step is to recognize that while the poor elephant may have a lot of different parts, it is one animal. In other words, there must be an over-arching policy set for land, not just a collection of policies and programs representing the particular mandates and objectives of individual departments. I am happy to take this opportunity to tip my hat to our host province, which has probably gone further in that direction than any other. Other provinces and territories have made some progress, but in most cases the blind men are still dominant.

And finally, policy must be translated into administrative structures, programs, and planning guidelines. If this conjures up a picture of massive government master plans dictating the disposition of every back yard and quarter-section, let me assure you that I would resist such a thing as strongly as anyone in this room.

What I am talking about is not centralized, detailed planning, but coherent sets of sustainability-based policies, criteria and guidelines to provide the framework within which each government department, public agency, regional commission and municipality can do its own land use planning in accordance with its own mandate, needs and preferences. I see such a system as a very practical way to carry out René Dubos' famous advice to "think globally, act locally".

I do not underestimate the difficulty of bringing about such a system. From our European political founders we have inherited a system of government organized around bureaucratic fiefdoms defined by function. This arrangement we have further complicated by a federal structure and a sometimes exaggerated deference to the "rights" of local governments. To establish effective policies, administrative structures and programs in a vital and sensitive area which cuts across all these entities and bundles of responsibilities will not be easy.

But it should not be impossible. If we have, not without cause, been called the world's most over-governed country, we have also shown some talent for overcoming or evading the political and administrative barriers which fragment us. The provincial governments do in fact work together with the federal government and with each other in the common interest, to an extent for which, in typically Canadian fashion, we perhaps do not give ourselves sufficient credit. Paradoxically, it sometimes seems more difficult to establish common policies to guide the actions of different departments nominally responsible to a single cabinet.

The issue comes back, as usual, to the need for political leadership, and in this respect I must acknowledge that the signals in the last few years from Ottawa in particular have not on the whole been encouraging.

Nevertheless, in the current climate of growing public concern about the present course of Spaceship Earth, I am hopeful that our political masters will come to realize that the land which is in every sense fundamental to ecological, economic and social systems alike cannot continue to be left to the haphazard attentions of the blind men. When this happens, land use planning will take the place staked out for it by Thomas Adams seventy years ago, as one of the most useful instruments available to us for safeguarding our environment and using our resources prudently and sustainably.

TITLE: Attitudes and Behaviours Required to Achieve Sustainable Development
SESSION: A.4
BULLETIN NO.: 7

BEATRICE OLIVASTRI, Executive Director of the National Survival Institute, said we need to think about our lifestyle. We are a consumer society, and must move towards being a conserver society.

She said: "We have to make choices. Some will be easy, others more difficult. But we must empower people, let them see that they do have an effect."

Teachers need the tools, resources and expertise to teach these concepts to children in order to improve critical thinking about the environment. Journalists also need more information. They are not as informed as they want to be or should be.

Olivastri says she sees barriers to sustainable development since most people are alienated from nature and our picture of nature is fragmented. "We have to learn to see links between our activities and the stresses they place on the environment," she said. "We must know we are part of a living and dynamic biosphere."

In Olivastri's opinion talking about a negative impact on jobs because of environmental protection is blackmail. "We don't have any vision. We're running scared. We're crisis-oriented. We must take time to look ahead," Olivastri said. "Vision workshops are needed to develop the vision or we will always be reacting to crises."

"Although much can be done in the schools, Olivastri said, we don't have time to wait. We must work on issues and concerns with adults."

HUGH PHILLIPS, Executive Director of SEEDS, outlined three notions about how significant changes in attitudes and behaviours will be brought about. There must be passion and power. Education and informed decision-making are keys to change. We must learn from the past and present to change the future.

Phillips said the three factors -- awareness, articulation and action -- which brought success for SEEDS can be applied to the development of attitudes and behaviours required to achieve sustainable development.

"First there must be joint ownership of the cause by industry, educators, government and social scientists. You must overcome the hurdle of resistance to co-operation," said Phillips.

Secondly, a leadership network, whereby your cause can be articulated in a variety of settings, is important. Finally, through stewardship you will have people who can share your environmental theories in a proactive sense and face-to-face.

BILL REES, Professor at U.B.C.'s School of Community and Regional Planning, stated that changes in attitudes and beliefs must occur to attain sustainable development.

Rees said we must discard the notion that the environment and the economy are distinct entities and that the economy could expand indefinitely. The survival of society depends on our recognizing that we are totally dependent on the biosphere - the dynamic, living system which sustains life.

"Our economy is literally consuming the biosphere. It is not productive, it only consumes," Rees said.

DISCUSSION

- Individuals exercise power as consumers and can put pressure on industry to deliver environmentally responsible products.
- Canada's consumption of resources is 40 - 80% higher per capita than other countries. We are hypocritical to criticize the way developing countries are using their resources.
- Major cause of environmental degradation is wealth.
- Non-government organizations need more funds to produce and make available educational resources which reflect the environmentalists point of view.
- To break down critical attitudinal barriers, we must convince business journalists to consider environmental factors. They must be willing to consider other measurements of material well-being.
- Technology is there for social revolution but we must write to policy makers to let them know that changes must be made.

ATTITUDES AND BEHAVIOURS REQUIRED TO ACHIEVE SUSTAINABLE DEVELOPMENT

Hugh Phillips

Executive Director, SEEDS Foundation
440-10169, 104th Street
Edmonton, Alberta T5J 1A5

ABSTRACT

Education is a key in the development of behaviors and attitudes. Any discussion about affecting behaviors and attitudes must include our responsibility toward the next generation.

SEEDS is an acronym for Society, Environment and Energy Development Studies. It is an educational foundation with a mandate to change the way young Canadians think about energy and environmental matters. SEEDS has been very successful in developing and disseminating its message.

Using the case study approach, the action of SEEDS will be analyzed. The key factors in SEEDS development which have helped it to achieve an energy and environmental literacy among 700 000 young Canadians will be identified. This will include discussion about consumer orientation, risk, ethics, collaboration and leadership.

These factors will then be applied to the development of attitudes and the behaviors required to achieve sustainable development, with particular emphasis on our Canadian youth.

SUSTAINABLE DEVELOPMENT: MYTHS AND REALITIES

William E. Rees, Ph.D.

The University of British Columbia School of Community and Regional Planning
6333 Memorial Road
Vancouver, British Columbia V6T 1W5

ABSTRACT

This paper describes some of the changes in socio-cultural beliefs, attitudes, and behaviour that will be required to give substantive meaning to the concept of "sustainable development." The analysis is based on a comparison of key assumptions underpinning modern economies with our emerging understanding of ecological reality.

The socioeconomic systems of industrialized nations are presently based on a perception of the universe as a mechanical clockwork. This gives us a world in which the environment is regarded as a distinct entity "out there" separate from, the human economy. It serves as an infinite storehouse of resources and sink for wastes, but is essentially static, inert, and passive. Resource depletion and pollution are seen as manageable problems that can be solved through "integration" of environment and economy. Our simplistic linear thinking suggests that if we press the environment too far, simply backing off will bring us safely back again. From this perspective, sustainable development becomes little more than a rationale for sustainable growth through improved environmental regulation. People are otherwise free to pursue their individual material self-interest without limit in an economy devoid of morality or ethical choice.

This main-stream perception is dangerously inaccurate. First, the notion of environment as distinct entity is a social and political myth. There is only a single entity, the biosphere and the human economy has always been an inextricable part of it. The long-term survival of society depends on our recognition of this biosphere as a dynamic, living, self-producing system upon which we are wholly dependent. Pollution is not the problem but the symptom of a greater malaise - the present unacknowledged but total functional integration of a growing economy within a limited "environment."

In this context, thermodynamic law dictates that the economy doesn't produce, it merely consumes. Industrial economies convert ecological capital into financial and material capital. This will inevitably lead to the destruction of the self-producing organization of the biosphere if the rate of conversion persistently exceeds the rate of formation of ecological capital. From this perspective, sustainable development requires that we abandon the material economic growth model, accept ecological limits on consumption, and learn to live on the interest of our remaining ecological capital. It also reintroduces ethical and moral considerations into the debate on global economic development in a world where 25% of the population presently consumes 75% of available resources.

SUSTAINABLE DEVELOPMENT: MYTHS AND REALITIES

INTRODUCTION, PURPOSE, AND SCOPE

Since being popularized by the Report of the World Commission on Environment and Development (The Brundtland Commission, WCED 1987), the venerable concept of "sustainable development" has inspired the enthusiasm of people on all sides of the economy-environment debate. In light of worsening global environmental trends, any concept that implies we can eat our developmental cake and have the environment too, is bound to have a certain popular appeal.

This does not mean there is agreement as to the nature of future development. To some ears, sustainable development is a long-awaited call for political recognition of global environmental decay, economic injustice, and limits to material growth. It therefore represents an opportunity for humanity to correct an historical error and develop a gentler, more balanced, and stable relationship with the natural world (see Robertson 1978 for one such option). This view of sustainable development also raises moral considerations such as the need in a limited world for more equitable sharing of the world's resources (see Kneen 1989).

But other people read a different message in Our Common Future. Indeed, the World Commission itself equated sustainable development with "more rapid economic growth in both industrial and developing countries" on grounds that "economic growth and diversification ...will help developing countries mitigate the strains on the rural environment, raise productivity and consumption standards, and allow nations to move beyond dependence on one or two primary products for their export earnings" (WCED 1987, p.89). Accordingly, the Commission indicates "a five- to ten-fold increase in world industrial output can be anticipated by the time world population stabilizes some time in the next century" (WCED 1987, p.213).

To those who regard present levels of industrial activity as the root cause of global environmental decline, the Commission's appeal for a "revitalization" of economic growth on this scale seems paradoxical at best. From this perspective, ballooning economic activity is simply not in the ecological cards. Nevertheless, the power of the growth paradigm is not to be underestimated. As sustainable development is gradually embraced by the political mainstream, its meaning drifts ever further from the ideal of sustainable environment toward the seductive temptation of sustainable growth.

This paper explores the prospects for "sustainable development" as conceived by the World Commission and supported by Canada's National Task Force on Environment and Economy (CCREM 1987). My premise is that the present economy-environment conundrum arises in part from a distorted perception of reality. Society operates from an outdated mechanistic perception of the economy and has only a rudimentary understanding of the dynamics of the economy-environment relationship. If this premise is correct, our present understanding of the so-called environmental crisis is dangerously superficial and the possibility of sustainable development based on the growth-oriented assumptions of neo-classical economics is illusory. Significant changes in socio-cultural beliefs, attitudes, and behaviour will therefore be required before sustainable development acquires substantive meaning. (See Appendix I for the author's definition of the concept.)

THE CULTURAL ROOTS OF REALITY

How society relates to the rest of reality is profoundly affected by an elaborate set of unconscious "facts," unquestioned assumptions, and entrenched beliefs. These are derived ultimately from the shared experience of a people in the course of their social evolution and are transmitted culturally to each new individual as s/he matures in that particular milieu. Such a common philosophy or world-view shapes every culture's social relationships, its political institutions, and the nature of its economic enterprise.

World-View as Social Myth

It is critical to recognize that there can be as many world-views as their are cultures and that each world-view only more or less coincides with reality. Thus, our most sacred beliefs, however well sustained by the evidence to date, may simply be wrong. The important point is that while we think we act from factual knowledge, much individual action and government policy is based on unsubstantiated belief. Indeed, much of our world-view may be little more than social myth, a collection of "shared illusions" (see Beer 1981).

In some cases, it is of no great consequence when even our most profound beliefs (e.g., "the world is flat") depart from reality. On the other hand, certain activities, long consistent with the prevailing world-view, may eventually produce significant problems or even a crisis. In these circumstances, society must modify its world-view to conform with the new reality. This should be kept in mind as we join in the quest for meaning in the concept of sustainable development.

Nature Estranged: The Clockwork Universe

The scientific or Cartesian world-view that presently dominates western society is characterized by a mechanical view of the universe as "a vast machine, wound up by God to tick forever, and consisting of two basic entities: matter and motion" (Capra 1983, Berman 1984, p.21). While it has much deeper roots, this vision flowered only in the 17th Century and is most closely associated with Rene Decartes, Francis Bacon and Isaac Newton.

Descartes set the stage with his division of reality into the independent realms of mind and matter and his quest for a universal mathematics to measure and order the external world.[1] The ultimate rationalist, Decartes saw even man's activity as a thinking being as purely mechanical. The mind has a certain method and *confronts the world as a separate object*. "It applies this method to the object, again and again and again, and eventually it will know all there is to know" (Berman, p.20).

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[1] This follows from Galileo's division of reality into the subjective (unmeasurable and therefore unreal) and the objective (accessible to science through measurement and mathematical analysis).

Descartes view of nature is of something devoid of spirit or higher meaning. The material world is posited as a grand machine, capable of being understood through its reduction into constituent parts. Through the separation of the observer from the observed, Descartes helped formalize the development of objective knowledge and his reductionist approach provided the methodological framework for all subsequent scientific enquiry.

Decartes' contemporary, Francis Bacon, represents the empiricist pole. He reasoned that to know nature one had to "vex" her, "torture nature's secrets from her" thus forcing her to yield unambiguous answers (see Capra 1983, p.56). In addition to the essence of experimental method, Bacon gave the new science its *raison d'etre*. He argued that knowledge should be put to work allowing mankind to take command over the natural world, its objects, and its mechanical powers. "From this perspective, knowledge is regarded not as an end but as a means, expressed and applied in technology, by which humans assume power over the material world" (Jones 1987, p.236).

Isaac Newton, while disproving many of Descartes specific hypotheses, ultimately succeeded in validating the Cartesian view of the universe. With the publication of his Principia in 1686, Newton revealed the seemingly universal laws of mass and motion which describe the universe as a mechanical machine of unlimited dimensions behaving according to strict mathematical rules. By revealing the *how* of the universe, Newton finally supplanted the mystical *why* of things, the question that had dominated learning since the days of the ancient Greeks.

By the end of the 17th Century the founders of the scientific world-view had abolished the ancient organic perception of the earth as a living entity, the nurturing mother. In its place they gave us a world in which humankind was set apart from a nature "out there" which in turn existed solely for our material benefit. In effect, "by separating and then eliminating all the qualities of life from the quantities of which they are a part, the architects of the machine paradigm [left us] with a cold, inert universe made up entirely of dead matter" (Rifkin 1981, p.22).

Material Man

It remained only for two additional thinkers to apply the mechanical world-view directly to human institutions and affairs. John Locke was driven to determine the "natural" basis of society. With God effectively removed from the workings of nature, Locke reasoned that religion and the unknowable could also no longer the rational basis for government. Left with "human beings all alone in the universe," he argued that society, "being made up solely of individuals creating their own meaning, has one purpose and one purpose only: to protect and allow for the increase of the property of its members" (Rifkin 1981, p.24). Moreover, Locke argued that the ownership of property conveyed not only rights, but an obligation to generate wealth: "He who appropriates land to himself by his labour, does not lessen but increases the common stock of mankind" (Locke 1967, p.312). Indeed, "land that is left wholly to nature ... is called, as indeed it is, waste" (Locke 1967, p.315).

Similar logic underpinned the "invisible hand" of Adam Smith. Smith argued that just as the planets conform to natural laws, so must economic behaviour obey subtle natural forces. Smith, like Locke, believed that the basis of all human activity was material self-interest, "but the study of [a person's] own advantage naturally, or rather necessarily, leads him to prefer that employment which is most advantageous to society" (Smith 1961, 1:475).

By this reasoning, "any attempt by society to guide 'natural' economic forces [would be] inefficient" (Rifkin 1981, p.26). Interference with the workings of the "invisible hand" for whatever noble purpose would only stifle economic growth. Significantly, this effectively excluded morality from the realm of political economy. "There are no ethical choices to be made, only utilitarian judgements exercised by each individual pursuing self-interest" (Rifkin 1981, p.27).

From its roots in the Cartesian paradigm, the social mechanics of Locke and Smith thus succeeded in reducing human beings to selfish egoists devoted mainly to economic production and consumption in the pursuit of endless material abundance.

MODERN MYTH: THE MECHANICAL ECONOMY

It should already be clear that even modern economics owes much to the scientific world-view. The founders of the neoclassical school, impressed with the spectacular successes of Newtonian physics, strove to create economics as a sister science, "the mechanics of utility and self-interest" (Jevons 1879, cited in Georgescu-Roegen 1975). Indeed, mechanical equilibria held a particular fascination. "Pareto [the father of welfare economics] and his followers...have taken the view that the notion of equilibrium is central to economic understanding, and is in effect the same thing as intelligibility. What is not in equilibrium, or seeking it, cannot be analyzed, since it is disorderly, irrational, and meaningless" (Shackle 1966, p.17).

The major consequence of the mechanical analogue is an entrenched view of economic process as "a self-sustaining circular flow between production and consumption within a completely closed system." By this perception, supply and demand functions continually readjust to each other, "everything...turns out to be just a pendulum movement. One business 'cycle' follows another... If events alter the supply and demand propensities, the economic world returns to its previous position as soon as these events fade out." In short, "*complete reversibility* is the general rule, just as in mechanics" (Georgescu-Roegen 1975, p.348, emphasis added).

The Worship of Growth

The notion of the mechanical economy raises the theoretical possibility of unlimited growth in an infinite universe. Today of course, economic planners seem to believe "not only in the possibility of continuous material growth, but in its axiomatic necessity" (Georgescu-Roegen 1977). This "growthmania" (Mishan 1967) "has given rise to an immense literature in which exponential growth is taken as the normal state of affairs" (Georgescu-Roegen 1977). Indeed, our "...largely uncritical worship of... economic growth is as central to [capitalism's] nature as the similar veneration of ...divine kingship or doctrinal orthodoxy has been for other regimes" (Heilbroner 1989, p.102). (For an expression of this view see Simon and Kahn 1984.)

That growth is firmly entrenched as the measure of progress is evident from a glance at the business pages of any daily newspaper. The annual increase in gross national product (GNP) is still taken as every nation's primary indicator of national health. Rates under 3% are considered sluggish, and most politicians and planners don't feel at ease until real growth tops 4%. While seemingly modest, even a 3% increase implies a doubling of economic activity in just 23 years!

It is noteworthy in the present context that capitalist states depend on the increasing size of the national economic pie to ensure that the poor receive enough of the national wealth to survive. Indeed, economic growth is a major instrument of social policy. By sustaining hope for improvement, it relieves the pressure for policies aimed at more equitable distribution of wealth.

Significantly too, while GNP is accepted as a measure of economic activity, we have no comparable metric for the state of environment or perceived quality of life. This is a revealing comment on societal perceptions, priorities, and the staying power of the materialist paradigm.

ECOLOGICAL REALITY

The emerging ecological crisis reveals fatal flaws in the prevailing world-view and the potential hazard increases with the scale of economic integration. As little as 20 years ago, environmental issues were considered to be local (e.g., a pulp mill), often focused on aesthetic concerns (mill odour), and were thought to be resolvable through technology (better scrubbers). Today environmental problems such as ozone depletion, the accumulation of greenhouse gases, and potential climate change are global in scope, raise concerns about systemic breakdown, and have no quick technical remedy. The threat of global ecological collapse is the product our whole way of being in the world, the cumulative effect of myriad individual actions in our day to day conduct of affairs. There is a fundamental dissonance in economy-environment relationships that must be acknowledged in any meaningful consideration of sustainable development.

From Environment to Biosphere

The first step is to recognize that the notion of a separate environment is an artifact of the Cartesian subject-object dualism. This objectification of the natural world was a unique and powerful product of the scientific revolution. In effect, it means that environment-as-separate-entity is a human invention. *We made it up!*

The psychological consequences of this invention are quite profound. By definition, "environment" becomes its own pejorative. It refers to whatever surrounds some other thing of greater interest or value. Thus, environment "diffidently declares itself to be peripheral, unimportant, not to be taken seriously" (Rowe 1989). We may recognize the environment as a source of resources and sink for wastes, but beyond that the natural world is perceived as a static backdrop to human affairs.

By this perception there is no compelling need to love, cherish, or even husband nature, to do anything beyond exploiting its bounty to our own advantage. By corollary, impacts of economic activity on environmental processes are perceived to be of little long-term consequence. Should something go awry, a simple retraction or some technological fix will set things right.

The problem is that economy and the environment have always been fully and inextricably integrated everywhere but in the Cartesian mind. That the economy has an independent life is a cultural myth, one of our most cherished illusions. For all its political and institutional sophistication, the human economy is "fundamentally directed toward a problem encountered by all other species - the dependence for life on materials from elsewhere in the biosphere" (Rapport 1984). Functionally speaking, there is no environment, only the biosphere, and humankind has always been part of it. The implications of this reality become clear in the following section.

Economy as Black Hole: The Thermodynamics of Growth

The mechanical paradigm enabled economic theory essentially to ignore the Second Law of Thermodynamics. This omission is at the heart of our ecological crisis. The Second Law states that in any closed isolated system, available energy and matter are continuously and irrevocably degraded to the unavailable state. (See Georgescu-Roegen 1975, 1977.) Since the global economy operates within an essentially closed system, the Second Law (the entropy law) is actually the ultimate regulator of economic activity.

Since all modern economies are dependent on fixed stocks of non-renewable material and energy resources, the Second Law declares that they necessarily consume and degrade the very resource base which sustains them. Our economies treat other components of the biosphere as resources and all the products of economic activity (i.e., both the by-products of manufacturing and the final consumer goods) are eventually returned to the biosphere as waste. Thus, the effect of the Second Law is to declare that economic "production" is really "consumption." So much for mechanical reversibility! Instead, all economic activity contributes to a constant increase in global net entropy (disorder), through the continuous dissipation of available energy and matter.[2] It follows that contrary to the assumptions of neoclassical theory:

- there is no equilibrium in the energy and material relationships between industrial economies and the biosphere; and
- sustainable development based on prevailing patterns of resource use is not even theoretically conceivable.

The thermodynamic interpretation of economic process therefore suggests a new definition of sustainable development in radical contrast to present practice: sustainable development is development that minimizes both resource use and the increase in global entropy.

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[2] For example, a finished automobile represents only a fraction of the energy and material that has been permanently dissipated in the manufacturing process. Similarly, modern energy-subsidized agriculture consumes up to 10 calories for every calorie of food energy produced.

The Special Case of Ecosystems

Ecosystems, like economic systems, depend on fixed stocks of material resources. However, the stuff of ecosystems is constantly being transformed and recycled throughout the system via food-webs at the local level, and biogeochemical cycles on a global scale. In addition, evolution and succession in nature tend toward greater order and resilience.

The material cycles and developmental trends of ecosystems thus appear at first glance to defy the entropy law. Ecosystems seem to be inherently self-sustaining and self-organizing, and therefore to contribute to a reduction in global net entropy. The property by which the biosphere continuously produces itself is known as autopoiesis. This key process is dependent on the maintenance of a highly evolved organizational relationships among biospheric components (species and ecosystems) and a minimal level of structural diversity.

Autopoiesis is possible only because ecosystems, unlike economic systems, are driven by an external source of free energy, the sun. Through photosynthesis, the steady stream of solar energy sustains essentially all biological activity and makes possible the diversity of life on earth. Thus, in contrast to economic systems, ecosystems steadily contribute to the accumulation of concentrated energy, matter, and order within the biosphere. In thermodynamic terms, photosynthesis is the most important (if not the only) productive process on the planet.

Photosynthesis is the ultimate source of all renewable resources used by the human economy. Moreover, since the flow of solar radiation is constant, steady, and reliable, resource production in the ecological sector is potentially sustainable over any time scale relevant to humankind.

But only potentially. Ecological productivity is limited by the availability of nutrients and ultimately the rate of energy input (the "solar flux") itself. Ecosystems therefore do not grow indefinitely. Unlike the economy, which expands through resource conversion and positive feedback, ecosystems are held in "steady-state" or dynamic equilibrium by limiting factors and negative feedback.

The Pathology of Economy-Environment Integration

This difference is significant because human beings and their economies are now a dominant component of all the world's major ecosystems. Since our economies are growing and the ecosystems within which they are embedded are not, the consumption of ecological resources everywhere has begun to exceed sustainable rates of biological production. It has been estimated that nearly 40% of terrestrial net primary productivity (photosynthesis) is already being used or co-opted by human activity and the fraction is steadily increasing (Vitousek *et al.* 1986). In short, far from treating it as a partner, the global economy is becoming the biosphere and in the process is dismantling it.

Over-exploitation is exacerbated by pollution which further impairs autopoiesis and the remaining productivity of ecosystems. The death of lakes and forest die-back due to acid precipitation in eastern Canada are familiar examples. Unfortunately, mechanical economics has all but ignored the downstream consequences of material dissipation. After all, pollution is the *entropy* law at work. While traditional market economics can always price the resource inputs to manufacturing (the supply side bias), it is virtually silent on the value of biosphere process resources.[3] Thus while economists argue that technology and resource substitution through the marketplace have eliminated any concern about resource scarcity, present markets don't even recognize such critical resources as waste absorption, material recycling, soil building, and climate stabilization. These process resources are becoming increasingly scarce and there are no substitutes.

Clearly, any human activity dependent on the consumptive use of ecological resources (forestry, fisheries, agriculture, waste disposal, urban sprawl onto agricultural land) cannot be sustained indefinitely if it consumes not only the annual production of the biosphere (the "interest"), but also cuts into the capital. Herein lies the essence of our environmental crisis. Persistent trends in key ecological variables - falling water tables, declining soil fertility, increasing CO_2 levels - indicate that we have not only been living off the interest but also consuming our ecological capital. This is the inevitable consequence of exponential material growth in a finite environment.

Viewing the decline of the biosphere in the same light as rising standards of living provides a novel perspective on at least one source of our unprecedented wealth. The intersecting curves reveal that throughout the industrial revolution we have been busily converting ecological capital into financial and physical capital.

This means that much of our wealth is illusion. We have simply drawn down one account (the biosphere) to add to another (material wealth). It might even be argued that we have been collectively impoverished in the process. Much potentially renewable ecological capital has been permanently converted into machinery, plant, and possessions that will eventually wear out and have to be replaced at the cost of additional resources.

To put it another way, we've long been enjoying a free ride for which payment has now come due. Forest products, food, and manufactured goods are undervalued in the marketplace to the extent the prices we pay do not include the costs of resource maintenance. Our paychecks and corporate profits are excessive to the extent that the resource base which produced them has been run down. The family's second car may represent capital that was not ploughed back into silviculture, soils management, and waste control. In short, the "good life" for some humans has been subsidized at the expense of other life on the planet, including future generations.

Carrying Capacity and Absolute Limits

The deteriorating biosphere suggests that human populations and the present scale of economic activity may already exceed the carrying capacity of the planet in significant ways and may not be far from absolute limits. Bryson (1989) approaches this question with a thermodynamic analysis of food production. He shows that we would need about 900 square metres of cropland to produce the average *per capita* food energy requirements assuming year round cropping. With an average growing season is only 180 days, each hectare of agricultural land will theoretically support about 5.5 people (10,000/900)*(180/365). The present world population density is about 3 persons per arable hectare. Hence we are within less than one population doubling of the "sunshine limit" to growth and at present rates will reach that limit in 35 years (Bryson 1989).[4]

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[3] The field of environmental economics is an exception but has focused almost exclusively on means to internalize pollution damage and avoidance costs. See Gosselink *et al.* (1974), and Westman (1977) for a broader perspective.

These calculations make no allowances for either resource degradation or technological advances. While such uncertainties make prediction about food limits hazardous, we can state that *per capita* grain production has declined each year since 1984, "falling 14% in over the last four years (Brown 1988, p.6); that available data on erosion and falling water tables suggest "sustainable world food output is now running well below consumption" (Brown 1988, p.7); and that "the backlog of unused agricultural technologies that farmers can draw on in some countries is dwindling" (Brown 1988, p.7). These data give reason enough to ponder absolute limits in a world where the human population is increasing by 90,000,000 per year. They also call to question the Brundtland Commission's route to sustainable development through a five to ten-fold increase in industrial activity.

SUSTAINABILITY IN THE REAL WORLD

To the extent the above analysis reflects reality, it represents a serious challenge to the central assumptions of our economy and to our present way of life. Adapting to this challenge will require radical changes to our cultural beliefs, social attitudes, and economic behaviour. Assuming that our will to survive can overcome our natural resistance to change, society must soon come to accept the following principles as central to sustainable development. Although not all these ideas has been explicitly addressed above, each flows from and is consistent with the preceding analysis:

- The economy is an integral component of the biosphere. The future of society is therefore wholly dependent on our ability to restore and maintain the self-producing structure and functional relationships of the biosphere (autopoiesis). This is in direct opposition to the claim of the National Task Force on Environment and Economy that "sustainable development does not require the preservation of the current stock of natural resources or any particular mix of ... assets" (CCREM 1987, p.3).
- Our present economic system encourages consumption. By contrast, sustainable development requires that we minimize resource throughput and the increase in global net entropy.

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[4] Recall that if a pond has a lily pad that doubles daily and completely covers the pond in 100 days, the pond is only half covered on the 99th day. The question is, have we reached the 99th day for humankind on earth?

- Bottom line economics encourages the liquidation of ecological capital stock (fish, forests, soil, etc.). By contrast, sustainable development requires that society live on the "interest" of our ecological endowment. Harvest rates in the renewable resource sectors must be limited to average rates of production and not be responsive to ever-increasing market demand.

- Rates of waste discharge (including pesticide use) must be limited to the rate at which ecosystems can absorb and degrade the wastes. Significant processing capacity generally exists only for ecologically benign organic waste and nutrients. (Assay for bio-accumulation of toxic substances in food chains can indicate when absorptive capacity has been exceeded.)

- In the case of carcinogens and similar dangerous compounds zero tolerance is warranted.

- People will have to pay the true costs of "production." In general, market prices should reflect private producers' costs for ecosystems maintenance (e.g., soils management). In other cases, an entropy tax should be imposed to provide public funds for common property systems maintenance. (An entropy tax on fossil fuels could be used to plant carbon sink forests to help stabilize atmospheric CO_2 levels [Rees 1989]). Where serious damage has already been done, society must be prepared to devote substantial resources to ecosystems rehabilitation. All this implies significant increases in operating costs and market prices.

- The maximum sustainable level of global economic activity is limited and depends on the condition of the biosphere. Exceeding current limits will reduce future potential in proportion to the damage done to biospheric productivity.

- The maximum sustainable human population (global carrying capacity) is a function of the nature of economic activity, technological sophistication, and mean *per capita* consumption (material standard of living). All these factors are subject to public policy adjustment. Population growth beyond the carrying capacity must be facilitated by improved technology or be accompanied by a proportional decline in standard of living.

- New systems of national economic-ecological accounts must be adopted to monitor the biosphere. Remarkably, macro-economic indicators such as GNP only monitor income flows, not the state of productive capital. Thus, "glowing economic reports are possible when the policies that generate them are destroying the resource base" (Brown *et al.* 1984).

- The new indicators might include Adjusted National Product (ANP), "consisting of GNP with the social and environmental costs deducted from it, rather than added to it" (Ekins 1986, p.129). Other accounts should monitor the state of biologically productive assets and key autopoietic processes such as pollution absorption, nutrient cycling, soils maintenance, radiation balance, atmospheric regulation, and primary production (photosynthesis). (The UNEP/World Bank [1988] call these "satellite accounts" revealing a continuing economic bias).

- It is important to recognize that in the absence of such accounts, inter-regional trade obscures people's perception of their obligate dependency on the biosphere. Importing ecological goods and services means importing carrying capacity from elsewhere. This undermines any psychological or spiritual sense of unity with the land and enables people to destroy their own local ecosystems through "development" with seeming impunity (Rees 1988b, p.286). Many regions and nations with excellent economic accounts (e.g., Japan) would be completely unviable as isolated ecological units.

- We must also realize that seemingly under-developed biological assets in one region may actually be performing vital functions that are fully utilized by people elsewhere. This is most evident when there are markets for specific ecological products such as the grain produced for export in Manitoba. However it is less obvious in the case of heretofore unaccounted vital services. The tropical rain forests are of concern to people everywhere as carbon sinks and for their possible role in maintaining atmospheric and climatic equilibria. Long-term global sustainability may require that we formalize these hidden relationships. For example, the wealthy industrialized nations of the North might consider purchasing the development rights to the Amazon and other tropical forest regions to preserve their ecological integrity.

- Trade also has important implications for equity in achieving global sustainable development. For example, wealthy nations may import non-surplus carrying capacity from poor regions at great unaccounted costs to the latter. This is the case when the global financial system compels developing nations to grow cash crops for export on their best lands at the expense of local staples production. This leads in turn to over-exploitation of marginal agricultural and forest lands as impoverished local people struggle to survive. Revised economic-ecological accounting would help to internalize these real cost factors into the terms of trade.

- Carrying capacity has other important implications for developmental decision-making. In current practice "taking environmental factors into account" usually means that long-term ecological productivity is "traded off" for short-term economic gain. Thus, while individual developments are approved on economic grounds the cumulative ecological impacts will eventually exceed regional (and global) carrying capacity. Sustainable development therefore requires monitoring cumulative impacts. This may require defining development regions for ecological accounting purposes.

- When the carrying capacity of a given management region has been reached, ecological factors must necessarily over-ride over economic considerations. The next project cannot be built. (If each nation or management region achieves regional ecological stability, the net effect would be global stability. Conversely, if most regions exceed their carrying capacities, global destruction is assured.)

- We must move from a society oriented to satisfying the artificial wants of a few to one committed to satisfying the basic needs of all.

- Society will have to pay the true costs of "production." In general, market prices should reflect private producers' costs for ecosystems maintenance (e.g., soils management). In other cases, an entropy tax should be imposed to provide public funds for common property systems maintenance. (An entropy tax on fossil fuels could be used to plant carbon sink forests to help stabilize atmospheric CO2 levels [Rees 1989]). Where serious damage has already been done, society must be prepared to devote substantial resources to ecosystems rehabilitation. All this implies significant increases in operating costs and market prices.

- Well documented ecological trends such as atmospheric change, forest dieback, and falling *per capita* food production indicate that we have already breached global carrying capacity. Thus even current levels of economic activity are not sustainable with present technology. People in the industrialized countries may have to lower their material expectations and even accept a decline in material standards to achieve sustainability.

- This situation would eliminate economic growth as an element of social policy. Social justice and equity considerations would require creative new policies for income redistribution. We may even have to move beyond paid employment as the means of access to the basic requirements of life to some other system of entitlement.

- Sustainable development represents an opportunity to shift the emphasis in development from quantitative to qualitative considerations. We might rediscover that development has more to do with community relationship, self-reliance, and personal growth than it does with increased economic capacity.

- Sustainable development may force significant restructuring of national economies in the developed nations (for example in the petroleum, automotive, and forestry sectors). This in turn may require new forms of social safety nets to catch and retrain workers displaced from ecologically unsustainable employment.

- Sustainable development reintroduces equity and moral considerations into global economic development. The wealthiest 26% of the world's population consume 80 - 86% of non-renewable resources and 34 - 50% of food supplies (WCED 1987). In a limited world, reducing the gap in living standards between the rich and the poor requires that any future economic growth be directed to the third world. Forgiving international dept, aid to rehabilitate tropical ecosystems, and programs to develop ecologically appropriate technology for the developing countries are examples of strategies the developed nations might implement to help redistribute global wealth.

- Global sustainable development demands the development of new forms of international cooperation and regulation to ensure acceptable standards for ecological stability. (No nation can achieve global sustainability in isolation.) This flies in the face of the current emphasis on competition, exploitation of comparative advantage, and deregulation as the means to stimulate world economic growth.
- Socially sensitive interpretations of sustainable development emphasize the opportunity for a return to community values, local control over resources, community-based development, and other forms of decentralized governance. This too confronts the current trends toward concentrated economic power and centralized political decision-making.
- Sustainable development presents an opportunity to eliminate the arms race and free up the resources required for planetary rehabilitation. Armaments presently consume a trillion dollars or "more than the total income of the poorest half of humanity" (WCED 1987, p.297). Brown *et al.* (1988, p.183) estimate that an annual commitment equivalent to only 15% of current arms expenditures would be adequate to begin the move toward global ecosystem rehabilitation and sustainable development. Optimistically, increasing numbers of nations will come to realize that national security lies more in rehabilitating ecological capital than in retaining military might. In short, the threat to our common biosphere may bring the people of the global village together to confront our common enemy, human-induced ecological decline. Pessimistically...

Conclusion

Most discussion of sustainable development in the sociopolitical mainstream today emphasizes the need to sustain economic growth. The assumption is that we can "account for" the environment through greater efficiency of resource use, improved technology, better pollution control, and wider use of environmental assessment (see for example CCREM 1987). Adoption of this incremental approach would result in little more than a somewhat better-dressed version of the status quo and require a minimum of adjustment by either industry or individuals.

This paper presents a dramatically different picture illuminated by the entropy law and the concept of carrying capacity. This contrasting light indicates that we may be fast approaching absolute limits to material economic growth. If this is the case, we no longer have the luxury of "trading-off" ecological damage for economic benefits if we hope to have a sustainable future. The maintenance of global ecological integrity necessarily becomes our highest priority and must be factored into every local and regional development decision. This is the real meaning of environment-economy integration.

While the conceptual framework merely stresses the obvious - a dependent part cannot grow indefinitely within a limited whole - acceptance that this simple truth applies to our ecological dilemma requires a profound shift in societal values and attitudes, and a major restructuring of national and global economies. On the positive side, the attitudinal changes and policy responses suggested herein have the potential to produce a more politically secure, ecologically stable, and economically just global society.

Those who argue that my interpretation is extreme and the suggested guidelines for sustainable development are utopian (or draconian, depending on your point of view!) have an obligation to refute the analysis. If my basic argument is sound, the real utopians - dreamers of the impossible - are those who still support the material growth ethic and maintenance of our economic status quo.

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APPENDIX

Defining Sustainable Development

The UN World Commission on Environment and Development defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Its report, Our Common Future, goes on to define "needs" as the "essential needs of the world's poor, to which the over-riding priority should be given." It also recognizes the "limitations imposed by the state of technology and social organization on the environment's ability to meet (those needs)" (WCED 1987, p.43).

Implicit in the definition are ecological, social, economic, and political considerations. Taking these factors into account, I offer following elaboration on the concept:

> Sustainable development is positive socioeconomic change that does not undermine the ecological and social systems upon which communities and society are dependent. Its successful implementation requires integrated policy, planning, and social learning processes; its political viability depends on the full support of the people it affects through their governments, their social institutions, and their private activities.

Several properties of sustainable development should be emphasized. Sustainable development:

1. is oriented to achieving explicit ecological, social, and economic objectives;
2. may impose ecological limits on material consumption, while fostering qualitative development at the community and individual levels;
3. requires government intervention, but also the leadership and cooperation of the private sector
4. demands policy integration and coordination at all spatial scales and among relevant political jurisdictions;
5. depends on educational, planning, and political processes that are informed, open and fair.

As this conference shows, not everyone agrees with this interpretation. Whatever definition finally wins general acceptance we will also need agreement on the overall goal for sustainable development. One possibility consistent with the present paper is as follows:

> To provide a secure and satisfying material future for everyone, in a society that is equitable, caring, and attentive to basic human needs.

TITLE: International Centre for
Sustainable Development
SESSION: A.5
BULLETIN NO.: 8

TANNER ELTON

"This conference is the springboard for developing concrete steps towards the establishment of the International Center for Sustainable Development," said Tanner Elton.

He explained that the mission of the center was to promote the application of environmentally sustainable economic development within and between the public and the private sectors, regionally, nationally and internationally. To fulfil this mission a number of objectives must be met: to promote integration into decision-making; be involved in information exchange and education; be a vehicle for promoting environmentally safe activities in industry; and involved in training and development at all levels.

Clients would include governmental agencies, non-government organizations, academia, business and industrial sectors, and the publics of Canada and other nations. Output from the center would consist of policy research and analysis, promotion of decision-making models, development and promotion of demonstration projects or project management, training and development, technology transfer and most importantly, database creation and integration.

The institute would serve as a network to other centres and institutes, conduct seminars and conferences on areas of concern, provide direct services (i.e., training), and participate in joint projects with government and industry. A non-profit organization, it would be financed by a public and private partnership.

"The concern for sustainable development creates the need for a center as a focus for sustainable development and a demonstration of sustainable development," said Elton. It would be a co-location of departments, agencies and associations and act as a joint facility."

"We are alive to the concerns of the large expectations especially in this time of restraint. The structure and nature is on the table and we anticipate that within two months definite plans on the direction of the center will be put forward," he said.

GERRY FITZSIMMONS

He stated that this was the first time to test the idea of an International Center for Sustainable Development and receive reaction from the public.

ART MAURO

The center's board should be a reflection of entrepreneurs and not academic or bureaucratic, said Art Mauro. It should assist in marketing of technologies and the resources should be sufficient to achieve credibility.

"Manitoba has the unique opportunity to do well because of its geography, its different ecozones, its economic diversity and its various ethnic backgrounds."

JACK DUBOIS

He explained that his main concerns were public participation in the mission of the Center, how the clients will be served, and what the institute would achieve. He was firm that the public be consulted soon and that the board of directors be non-partisan. He felt that there was a need for greater public awareness.

ISSUES RAISED FROM THE FLOOR

- A concern that the financial assistance be sufficient for center to be credible; the reported $5 million may not be sufficient.
- Agriculture, conservation and land use planning is required for third world countries. The number one environmental concern in third world countries is agriculture and degradation of land.
- It is important to bring in the health and social dimensions to the center.
- The center should publish a journal similar to National Geographic which would include advertisements that would bring in resources.
- The academic model may have more credibility internationally than the business model.
- Board should consist of appointments from both international and national levels and include third world participation.

PANEL SESSIONS ON THE INTERNATIONAL CENTRE FOR SUSTAINABLE DEVELOPMENT

Room 12, Winnipeg Convention Centre
Session A5. 10:30 - 12:00 Session B5. 15:30 - 17:00

In September 1988, in a speech to the United Nations, the Prime Minister committed the Government of Canada to establish in Winnipeg a centre which will promote internationally the concept of environmentally sustainable development.

These workshop sessions will provide to conference attendees an opportunity to hear preliminary ideas about the centre and to participate in discussions about its potential role. The afternoon session will be a repeat of the morning session, except that the changes in the panel members, commentators and audience will allow different perspectives to be highlighted.

Chair:

Dan Archer	Director Sustainable Development Manitoba Industry Trade and Tourism

Panel Members:

Gerry Fitzsimmons	Director Federal-Provincial Relations, Environment Canada
Tanner Elton	Deputy Minister, Manitoba Environment

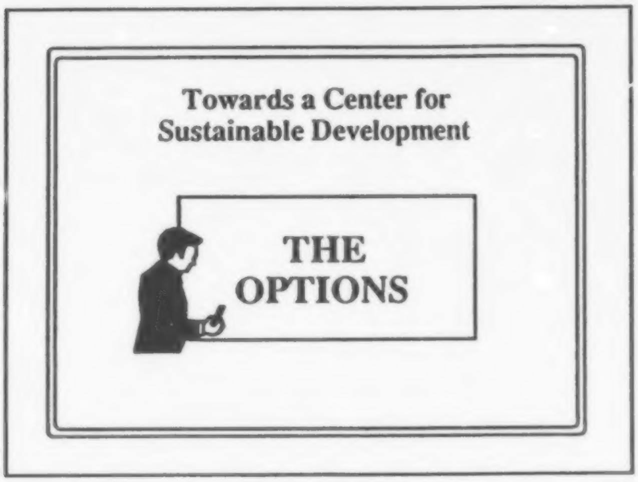
Commentators:

Jack Dubois	Associate Curator, Manitoba Museum of Man & Nature Chairman, Manitoba Environmental Network Member, Manitoba Round Table on Environment & Economy
Art Mauro	President and CEO, Investors Group Inc. Member, Manitoba Round Table on Environment & Economy
Ken Harley	Executive Director, Inter-American Development Bank, Washington D. C.
Ray Côté	Associate Director, School for Resource & Environmental Studies, Dalhousie University Co-chair, Private Sector Environment-Economy Committee, Nova Scotia

INTERNATIONAL CENTRE FOR SUSTAINABLE DEVELOPMENT

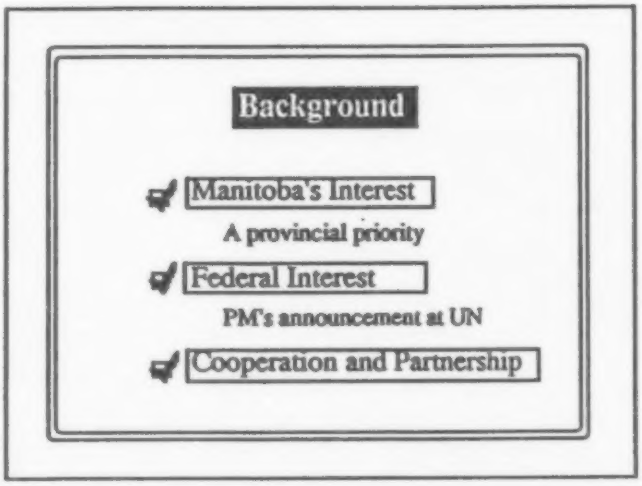
Tanner Elton

Deputy Minister, Environment Manitoba
Room 350 Legislative Buildings
Winnipeg, Manitoba R3C 0V8



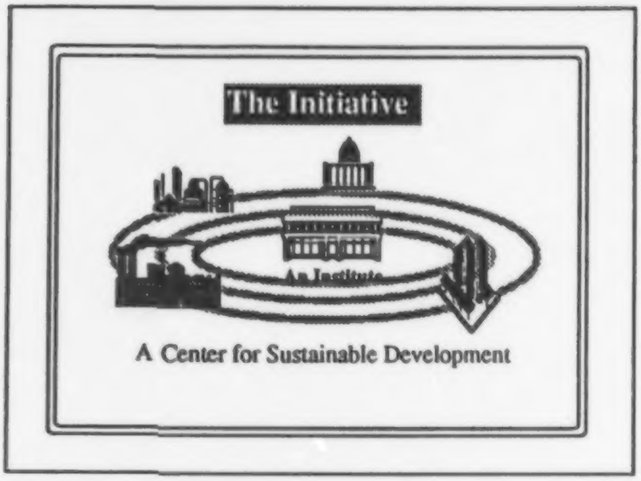
Towards a Center for Sustainable Development

THE OPTIONS



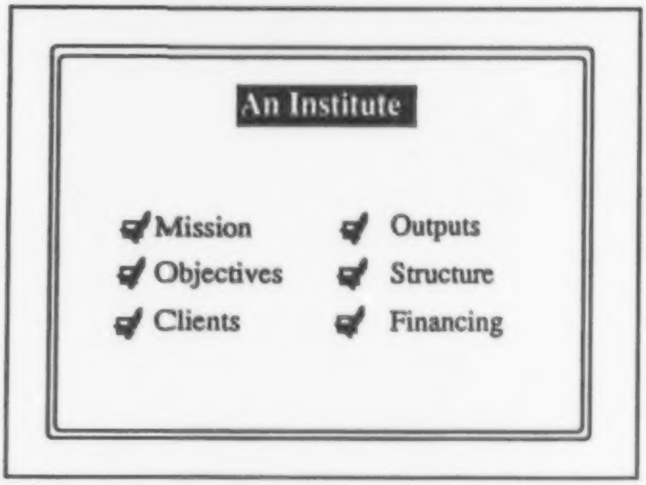
Background

- ✓ Manitoba's Interest
  - A provincial priority
- ✓ Federal Interest
  - PM's announcement at UN
- ✓ Cooperation and Partnership



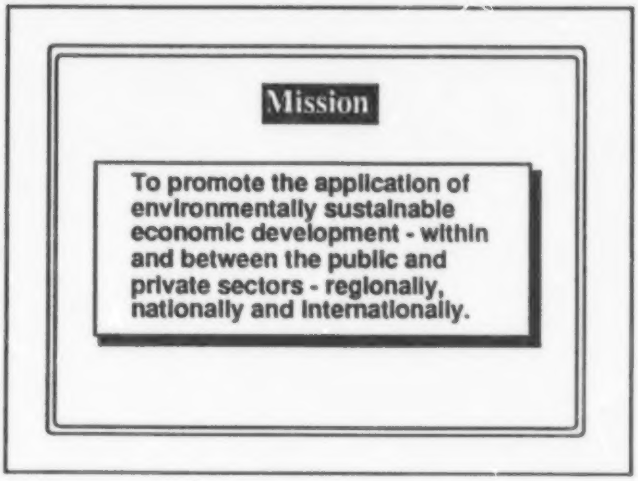
The Initiative

A Center for Sustainable Development



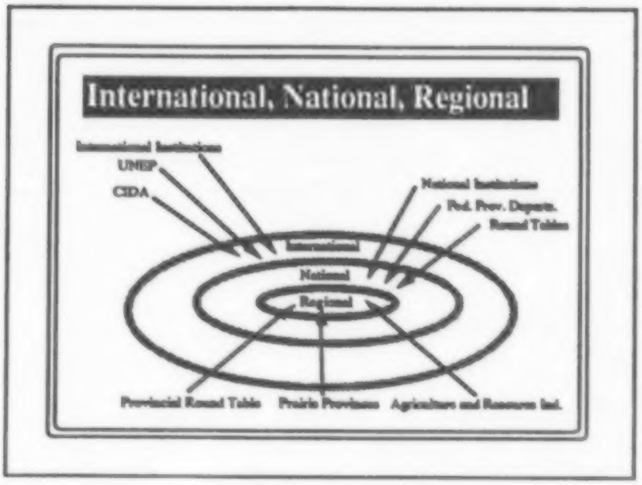
An Institute

- ☑ Mission
- ☑ Objectives
- ☑ Clients
- ☑ Outputs
- ☑ Structure
- ☑ Financing



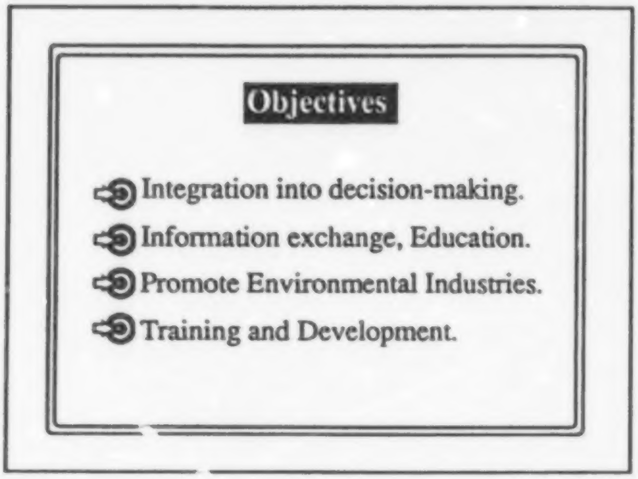
Mission

To promote the application of environmentally sustainable economic development - within and between the public and private sectors - regionally, nationally and internationally.



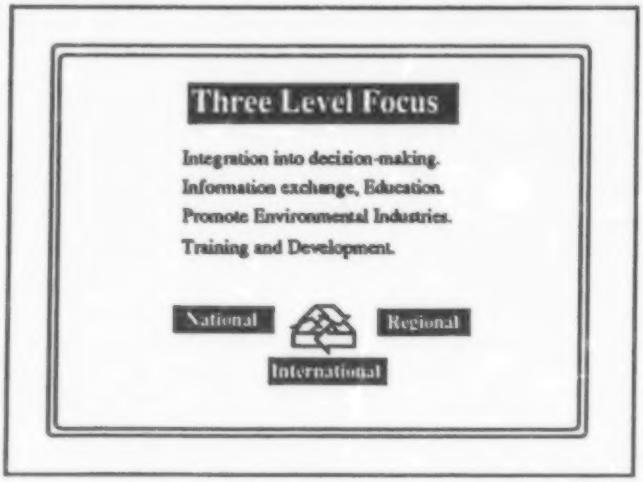
International, National, Regional

International Institutions
UNEP
CIDA
National Institutions
Fed. Prov. Departs.
Round Tables
International
National
Regional
Provincial Round Table
Prairie Provinces
Agriculture and Resource Ind.



Objectives

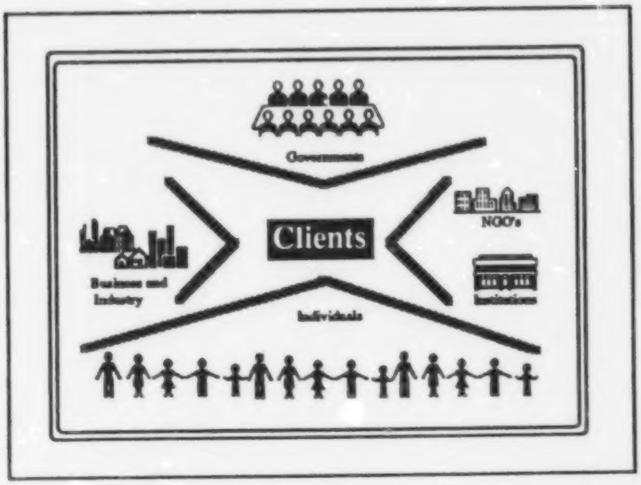
- Integration into decision-making.
- Information exchange, Education.
- Promote Environmental Industries.
- Training and Development.



Three Level Focus

Integration into decision-making.
Information exchange, Education.
Promote Environmental Industries.
Training and Development.

National
Regional
International

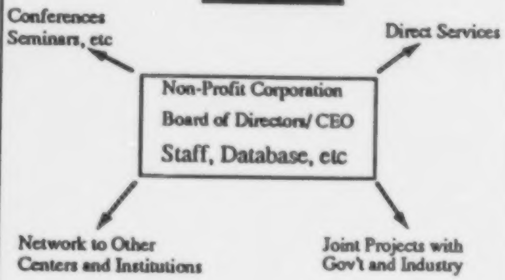

Governments
NGO's
Business and Industry
Institutions
Individuals

Clients

Outputs

☑ Policy Research and Analysis
☑ Decision-making Models
☑ Demonstration Projects/ Proj. Management
☑ Training and Development
☑ Database creation and Integration
☑ Technology Transfer

Structure



Conferences
Seminars, etc

Direct Services

Non-Profit Corporation
Board of Directors/ CEO
Staff, Database, etc

Network to Other
Centers and Institutions

Joint Projects with
Gov't and Industry

Financing

- Reflect Partnership
- Public and Private
- National and International
- Critical Operating Level

A Center for Sustainable Development

- A focus for Sustainable Development
- A demonstration of Sustainable Development
- Co-location of Departments, Agencies, Associations
- A Joint Facility

What is the Institute to Achieve?

- Who are the Clients?
- What are their Needs?
- Where are they?

How will the Clients be Served?

- What will be the mission?
- Objectives, role, function, etc

What Resources are Required?

- Level?
- Source?

What Structure?

- Business or Academic Model?
- Critical Mass or Fee for Service?

TITLE: Canadian Environmental
Business Opportunities
SESSION: A.6
BULLETIN NO.: 9

PAT LENNON

"Government studies indicate the environmental industry to be a sector coming into its own with many strengths, and offering excellent prospects with a 20-40% annual growth rate," said Lennon. He said, environment is emerging as the business of the 1990's, with opportunities flowing from growing environmental awareness, expanding legislative framework and a mushrooming agenda for action.

There is an unprecedented need to find the best, most cost effective and newest approaches to resolve mounting environmental hazards, said Lennon. This means developing and implementing new operational strategies by governments and industry to reduce, reuse and recycle waste as well as recover, restore and replace it. These strategies include manufacturing processes, hotel "grey water" recycling, metalplating waste recovery and municipal solid waste disposal.

Lennon estimated that some 3500 environmental equipment and service firms operate across Canada. As well Canadian environmental activity comprises some 110,000 jobs and $7 billion in goods and services.

Lennon forecasted the areas of growth in Canada to include solid hazardous waste disposal, potable water and wastewater treatment segment and air pollution control equipment and services.

U.S. market opportunities for Canadian environmental and engineering firms are in hazardous waste management, centralized waste processing, land fill gas utilization, energy from waste systems, computerized process controls, and indoor air quality research.

He said a key competitive factor will be the development and use of innovative technology.

JOHN A. BENNETT

"My advice to any young person is to get into the environmental business," said Bennett. "Environmental consultants are professional experts that are valuable monitors of all forms of human activity on this planet."

He said business opportunities exist because firms faced with the extraordinary costs of trying to undo environmental damage are shifting their emphasis toward anticipating and preventing environmental damage before it occurs. These firms are the market for services in the pre-feasibility and design phases of projects not just during remedial action.

North America is the number one target area, said Bennett. "If good service or innovative equipment satisfies the environmental requirements, then your market has increased by ten fold due to free trade."

He said "there is a need to re-think the old remedies to environmental problems because new standards and legislation are forcing new solutions.

Bennett said in international markets Canada is perceived as a high technology nation,a producer of quality products and services,supportive and non-aggressive country, fair bargainer, and usually having lower costs than other high technological countries.

His advice to new companies in the environmental business is to try to find a niche in the new technologies and develop it first closer to home.

"The words that get attention these days are clean technologies, sustainable development and recycling."

NEIL ANDERSON

From a background of surveys and mapping Anderson said he sees a major opportunity for environmental data to be supplied by firms utilizing GEOGRAPHIC INFORMATION SYSTEMS (GIS). This is expected to produce a major product line with a high requirement for data standardization. He called GIS the foundation for planning as an information infrastructure needed by environmental firms.

CONCLUSION

- High growth potential is fuelled by increased awareness, legislation and environmental disasters.
- Business opportunity should focus on prevention, recycling and reclaiming.
- Innovative solutions require entrepreneurial skills.

CANADIAN ENVIRONMENTAL BUSINESS OPPORTUNITIES

Patrick Lennon

Manager, Environmental Industries Project
Industry, Science and Technology Canada
235 Queen Street, 7th Floor, East Tower
Ottawa, Ontario K1A 0H5

Good morning, I would like to thank the Manitoba Government for inviting Industry, Science and Technology Canada (ISTC) to this important conference, to speak about environmental business opportunities, in Canada and abroad.

Background:

We at ISTC, about two years ago, set out to explore Canada's Environmental Industry -- it appeared to be a sector coming into its own, one which had many strengths, and one which offered excellent prospects with a 20-40% annual growth rate. We also found the industry as largely unidentified and lacking cohesion and not positioned to take advantage of the growing number of business opportunities.

We've also discovered debate: -- What is an Environmental Industry? Who is to be included? What is an environmental product? Who's definition of sustainable development shall we adopt? What does environmentally friendly really mean anyway?

Without going into our seven pages of a still-evolving definition, I hope that it's sufficient to say that the Environmental Industry is one which provides products and services which have as their effect the conservation, protection and enhancement of the environment. Specific exclusions to this definition are areas such as cultural heritage, energy conservation, provision of water supply systems and flood control.

Worldwide Trends:

For those of us looking at the world -- at growing markets, at emerging technologies, at policy and action via legislative and regulatory responses -- business opportunities seem to be everywhere; yet for many in the industry, grabbing the brass ring may be elusive indeed.

We frequently hear that we live in an increasingly complex and integrated world, but nowhere does this seem to be more in evidence than in the realm of the environment. For firms in the environmental industry, this is a powerful agent for positive consumer, industry and government action, which should have the effect of greatly expanding business opportunities.

The need to fully address environmental concerns is resulting in an unprecedented search to find the best, most cost effective, new approaches to resolve mounting environmental hazards. This means the development and implementation of new operational strategies by governments and industry to reduce, re-use, recycle waste as well employ a few other "R's" such as recover, restore and replace (taking liberties with the 4 "R's"). New strategies are now being introduced in virtually all fields of endeavour: from manufacturing processes, to hotel "grey water" recycling, to metal plating waste recovery and municipal solid waste disposal.

The growing attention worldwide to the environmental dimension and the need to act on the evidence in a deliberate way is developing a full agenda for the future, --- meaning business opportunities for you, The Canadian Environmental Industry:

-Increased funding for environmental projects and impact assessment sign-offs by international financial and donor organizations;

-New and stronger legislation driving environmental protection, in Canada and elsewhere;

-The replacement of ageing environmental related infrastructure;

-Global issues such as the protection of the ozone layer, concerns about global warming and a possible law of the atmosphere;

-Major regional plans such as the clean-up of the Mediterranean/The Great Lakes/The St. Lawrence/The Rhine/The Ganges.

Domestic Situation:

On the domestic scene, it is estimated that some 3500 environmental equipment and service firm operate across Canada. From this total, we have identified so far some 700-800 active players of whom approximately 250 are considered major marketers. It has been estimated that the total scale of Canadian Environmental activity as comprising some 110,000 jobs and $7 billion in goods and services. Information gathered to date suggests that the Canadian Environmental Industry accounts for more than a billion dollars of production.

Nova Scotia, Ontario and British Columbia have recently completed studies on the prospects for their provincial environmental industries -- work which concludes we have a nascent industry with world class prospects.

New opportunities in Canada via response to government initiatives will be found in: The implementation of the Canadian Environmental Protection Act and The Federal Water Policy, The St. Lawrence River and Great Lakes Clean-Ups, The Manitoba Centre for Sustainable Development, and New Provincial Environmental Legislation.

Some of the resulting areas of industry growth in Canada include the following:

Solid Hazardous Waste Disposal

- Considered among the fastest growing segment of the industry. Public concern, increasing restrictions on land fill site use, treatment of old sites and the requirement for improved handling of hazardous waste will stimulate the adoption of new methods of handling and disposal. As news articles indicate, the disposal of biomedical waste will be an important contributor to growth;

Potable Water and Waste Water Treatment Segment

- Expected to as a result of tighter municipal regulations. An example is the Municipal Industrial strategy for abatement in Ontario. New wastewater and sewage projects (e.g. Ottawa Sewage Treatment Facility - 300 million) will contribute to future demand but the major emphasis will likely be on upgrading, repairing or replacing existing older facilities. For municipalities, the timing of such projects will be determined by Legislative requirements and funding availability. The industrial waste treatment segment of the market is also forecasted to experience strong growth, however, the varied needs will demand more complex treatment technologies;

Air Pollution Control Equipment and Services

- Also forecasted to exhibit vigorous growth. Various types of detection and monitoring equipment (e.g. warning devices on underground storage tanks, gas detection equipment) will play a sizeable role in this market., Public awareness regarding air quality issues and the trend to process improvements versus end of pipe applications will give rise to increased sales revenues;

- Geographic information systems, resources and environmental planning, environmental data processing and modelling, re-cycling and monitoring and chemical analysis demonstrate good potential growth areas for the Canadian Environmental Industry.

It is evident that this industry is and will be a growth industry for yours to come. The rate and timing of growth is difficult to determine at this time without better industry intelligence and statistical systems being put in place. Factors that will influence the timing of future opportunities include private sector adoption of environmentally safe manufacturing and other processes, entrenchment of the polluter-pay principle, and integration of environmental considerations in economic decisions.

The rosy growth picture must be tempered by the strong competitive situation that Canadian firms will face. Imports already play a major role in the domestic market and an estimated 50% of water treatment equipment sold in Canada imported from the USA.

International Situation

Clearly, the USA is Canada's largest market with its $70 billion in annual pollution abatement and control expenditures. It is very much a legislatively driven market with: The Clean Water Act, Resource Conservation and Recovery Act, Safe Drinking Water Act, Occupational Health and Safety Act and others.

Free Trade is expected to have positive impacts on the Canadian Environmental Industry. However, set-asides and buy America Próvisions in US Federal Government Assisted Local Projects, which Canadian firms may pursue, may restrict our participation.

US market opportunities for Canadian Environmental and Engineering Firms seem to be in Hazardous Waste Management, Centralized Waste Processing of Bio-Medical and Hazardous Wastes, Land Fill Gas Utilization, Energy from waste systems, computerized process controls, and indoor air quality research.

Beyond USA, the second market segment which Canadian Firms have pursued originate in the many projects funded through CIDA, The World Bank, and The Regional Banks, such as The Asian, African, and Inter-American Development Banks.

World Bank Technical Data Sheets reveal that environmental projects tend to resource development, water supply, land rehabilitation, wastewater and solid waste disposal. Also appearing with increasing frequency are reforestation, coastal waters, river clean-ups, and fisheries rehabilitation projects.

Canada wins about 2% of the $7.5 - 10 billion in environmentally related contracts awarded annually by the International Financial Institutions. In doing so, Canadian firms have won some 33% of their tenders submitted -- a high success ratio, which means they could be going after even more.

Rapid industrialization and urbanization in countries such as Taiwan, South Korea, India and Brazil are causing serious environmental degradation, threatening the continuation of their economic growth. South Korea is expected to spend some $750 Million in the next five years. Taiwan needs some $10 billion new investment in water and solid waste disposal systems -- Hong Kong some $1.2 billion. For example, in Taiwan, their shopping list include environmental quality assurance monitoring systems, air and noise monitoring systems, numerous municipal sewage projects, and waste disposal (44 incinerator plants). A recent China market study also indicates a $1 billion market for water and wastewater treatment equipment.

Technology

Whether you serve the domestic or international market or both, a key competitive factor will be the development and use of innovative technology in meeting the market challenge. It is not going to be sufficient to be just cost-competitive as new regulations demand more sophisticated technology to address environmental problems. This will not be easy as different political jurisdictions adopt various standards.

A potential technological strength for the Canadian Industry will centre on the collaboration between Governments and the private sector for research and development and product commercialization. Some existing examples are:

- The oil from sludge technology developed by Doe's Burlington Centre is now privately licensed to enersludge - the process makes #5 and #6 grade oil;
- Doe's River Road facility in Ottawa, helped design a device by Morris Industries Ltd. of Vancouver which has become one of the largest selling small oil skimmers in the world.

Other trend setting technologies being fostered by the Canadian Industry include the desulphurization and denitrification of exhaust gases, zero discharge systems for treating metallic wastes and biological water treatment.

ISTC Role:

For the industry, we know that it is still the bottom line that is important.

So what is ISTC doing about it? Up to a few months ago, our ongoing environmental industry related activities have been divided among environmental consultants, engineers and equipment makers. We are now in the process of integrating the interests of these three groups in an initiative designed to focus on the development of the Canadian Industry's commercial viability, competitive technology, and new markets penetration. This also includes links to initiatives in advanced materials, biotechnology, and information.

Federally, we are working with Environment Canada, External Affairs, CIDA and others. We also plan to work closely with the provinces regarding their industry support through R & D and promotion activity.

As part of the St. Lawrence River Action Plan, ISTC is also currently launching the St. Lawrence River Environmental Technology Development Program -- it is national in scope and provides some $20 million for Technology development for the clean-up of industrial effluents. Aimed at Quebec's largest polluters along the river, we are very much interested in seeing proposals which would result in technology which would be marketed world wide. The objective of the program is best summed up in our promotional a/v "Save a River, Build an Industry".

Other ISTC major activities in support of the industry's development include:

- Collecting statistical data on environmental production, shipments, exports, and expenditures in Canada which is badly needed;
- Profiling the sector, and identifying particularly critical technologies;

- Taking a hard look at means to transfer technology from public agencies and foreign sources to the Canadian Industry and to encourage the industry to take on a greater share of R&D;
- Studying of promising market segments domestically and abroad; and
- Studying the commercial case for large scale demonstration projects.

Some deliverables which industry members have already indicated to us that would be helpful include:

- The creation of a National Trade Show/Conference, targeted at Canadian customers;
- The production of a complete directory of Canadian Environmental Industry goods and services;
- The formation of joint ventures and consortia to win foreign contracts for large projects;
- Networking with international financial and other institutions to open channels for Canadians; and
- Encouraging more participation in foreign trade shows and missions.

It goes without saying that environment is emerging as the business of the 1990's, with opportunities flowing from growing environmental **awareness, expanding legislative framework** and a mushrooming **agenda** for action.

I invite you to call upon us or the services of our regional office to assist in your efforts. As we learn more about this growth industry, our plan is to share these new findings with you and work together to develop the many business opportunities.

Thank you.

BUSINESS OPPORTUNITIES IN ENVIRONMENTAL MAPPING

N. M. Anderson

Director, Canadian Hydrographic Service
Department of Fisheries and Oceans
#211-615 Booth Street
Ottawa, Ontario. K1A 0E6

I. Introduction

A considerable amount of discussion, debate and studies on the threats to the environment, the need for action now to protect the environment and the need to develop environmentally sound strategies for economic development have brought these issues to the public and political forums. A multitude of task forces, conferences and forums have set the stage for the necessary action.

Some might say that to date there has been a lot of talk and little action. However, important progress has been made in the areas of research required to understand the underlying issues. New environmental sciences based on ecology and ecosystems have matured. Projects both large and small have demonstrated that conservation and clean-up can be successful. Not only has there been considerable progress in developing the methodology of environmental impact assessment but the process is also accepted and applied to new initiatives that will affect the environment.

Most important from a business point of view is the new public and political awareness of environmental issues. The public recognizes that action must be taken and consequently politicians can now act with wide public support. This means that government resources can be committed to environmental programs along with new legislation to strengthen the mandate for action.

Nevertheless, most would agree we are only at the beginning of developing economies built on environmentally sound, sustainable development principles. A lot of warning flags are up: climate, ozone, dioxins, cancer, etc. The research so far has mainly been discipline specific and research scientists have had to base their results on sparse data sets. Consequently, conclusions are open to debate among the scientists, challenged by their opponents and subject to error by the decision-makers.

What is the next stage of development? The framework for the Report of the National Task Force on Environment and the Economy is based on the principles of "shared responsibility and integrated decision making". "The recommendations reflect the ***fundamental importance*** of education and ***informed decision making*** within and among ***all*** sectors of Canadian society." What does this mean in terms of work? What needs to be done in order to be able to achieve these objectives? Are there business opportunities for the private sector to carry out the work? Are there opportunities for Canada to develop expertise, products and services from this work that can be exported? Today we know what needs to be done to support education and informed decision making and yes, there are business opportunities.

In fact there are many good examples in Canadian history of how we have developed an industry in Canada to meet Canadian needs and then exported the expertise, products and services. One example is the aerial surveying and mapping industry and this example relates directly to the challenges and opportunities of surveying and mapping the environmental and resource parameters. In the broad fields of surveying and mapping, surveying or data collection is the process of measurement; mapping is correlating or showing the relationships of the data. The business opportunities in developing this multipartite information support structure to initiate environment-economy integration can be discussed at three different levels: the project or program level, information infrastructure, and value-added products and services.

2. Projects and Programs and Mission Oriented Departments

Two projects designed to integrate multipartite processes are mentioned in the Progress Report—The St. Lawrence River Project in Quebec and the Cargill Project in Alberta. Several other projects are also being developed in Canada that involve interdepartmental (federal and provincial) coordination and cooperation. Each of these projects is attempting to integrate and correlate diverse data sets involving environmental, resource and economic parameters. In each of these projects the scientists are dealing with the problems of inadequate data; data that has been collected and processed for other applications, resulting in the difficulty of mapping multipartite processes. Common to virtually all of these problems of data integration is the spatial location of the data necessary to allow accurate correlation.

Most program departments are currently mandated to collect data to support research in their specific disciplines. These include the provincial and federal mapping departments which provide base mapping including land use, property ownership, resource parameters, etc.. The Environment, Agriculture, Energy, Forestry, Health, Fisheries departments etc. are all to some degree involved with the acquisition of geographical data and in developing and managing geo-related databases. In most cases the data is collected, processed and managed to meet the specific needs of the department. Seldom is it collected for general use by other government departments, industry or non-government uses.

In this context the existing research of the relationships of resource and economic parameters in support of sustainable development has been exploratory at best. Often the data that is available is inadequate for clear, undisputed decision-making which is both environmentally and economically sound. Based on this inadequate data, environmentalists are often accused of overstating the issues and/or that they are basing conclusions on unreliable data. The developers are accused of withholding data and/or basing decisions on short-term economic gains. Within this polarity it is difficult for the general public to obtain a clear picture of the degrees of importance of the issues. Consequently, it is equally difficult for politicians to support decisions that are costly to the taxpayer in the short-term in order to support long-term sustainable development. However, program departments are adopting new policies based on sustainable development. They now have the support to restructure existing programs and to create new programs designed not only for specific disciplines but as part of multidisciplinary projects designed to integrate environmental, resource and economic information.

This extension to include more and more diverse parameters into the research process parallels the past development of other geographically based systematic surveys. Basic topographic and hydrographic mapping was extended to include soils and climate for agricultural development, geomagnetic, gravity and seismic parameters for oil and gas development and so on. In general, new disciplines were added to the previous mapping databases. In each case new levels of data integration were required.

Currently there are a number of projects underway or proposed that bring together multi-departments and organizations in a particular geographical area to map environmental and resource parameters. ***Geographic Information System (GIS) technology is the principal technology to facilitate this integration and the correlation of the multipartite processes.*** The projects are important in order to develop and demonstrate the multipartite processes. At the program level, mapping departments and divisions within departments need to look at extending their mapping programs using GIS technology to include more data, or at least to structure their data to facilitate integration with other environment-economic databases. Similarly, environmental scientists, economic planners and resource developers need to demand better data structured for ease of access and integration.

Although in exploratory science, scientists have often gone into the field to collect their data, systematic environment-economy surveys can best be carried out by companies in the private sector that specialize in this type of mapping. Systematic mapping has been contracted out to the private sector and through these programs, companies have developed and exported their expertise. The federal policy for program departments to contract out for services supports this approach. The Canadian aerial mapping industry developed in the postwar years under a federal program of contracting out a national mapping program. The industry used this expertise as a base to develop an internationally recognized excellence in all areas of surveying and mapping. By 1979, 70% of the aerial mapping projects being carried out in developing countries were carried out by Canadian companies and 40% of the industry's revenue was in foreign currency. That's good business for Canada and represents a Canadian niche in the international market place.

3. Information Infrastructure

Environmental scientists faced with using other people's data to integrate and correlate what might originally have been considered as diverse and unrelated data sets are familiar with the problems of spatial relationships, non-standard classifications and the difficulties of location and access. In virtually all cases the data have been collected and processed for specific applications within a scientific discipline. They have not been designed as part of an integrated infrastructure although in virtually all cases the data is required for other uses.

No sustained organized management of environment-economy developments can be achieved without a supporting infrastructure. Infrastructure is a prerequisite to the efficient and effective development of a new resource. In this case the resource is information; information that is derived from multiparameter, integrated database networks that are needed to support informed decision making. The infrastructure required is based on the systematic collection and organization of data that incorporates environmental, resource, economic and social data into the same system. Roads, highways, railroads and airports provide the transportation infrastructure. Hydro-electric, fossil fuel and nuclear power facilities are the power generators and connected through a power grid form the electrical insfrastructure. Each is based on common standards, networking and ease of access by the industry. ***In fact , common to all infrastructure are three principal characteristics; a common set of standards, an integrated network and a design that facilitates simple third-party access.***

An example of an information infrastructure is the database network for airline reservations. At one time each reservation database was created in a non-standard form to meet the needs of the parent airline. Common standards, networking and simple third party access transformed these databases into an infrastructure that now facilitates access not only by the airline industry, but also by travel agents and many other users. Being a part of this infrastructure can be critical to the economic welfare of an airline.

Informed decision making for environmentally sound sustainable development must also be based on comprehensive, integrated information. The existing databases as well as the new data of environment, economic and resource parameters need to be transformed into an infrastructure built on common standards, networking and simple third party access. Until now technical limitations have made it virtually impossible to create this kind of infrastructure. However, computer technology and the application of this technology to processing and managing geo-related information provides that capability. GIS technology has now evolved to a state where it is available as an effective technology to integrate and manage geographical data. High volume, high speed data communication networks facilitate the networking of data bases in different locations.

Geomatics, the science of processing and managing diverse but geo-related data bases, is however less mature and requires further research and development. What are least developed are the standards and the database architecture needed to build the infrastructure. Although a considerable amount of work will be required before a common set of standards is adopted and databases are designed and networked for ease of access by all users in the sustainable resource development industry, work is underway and progress is being made. Nevertheless, enough is understood to apply GIS technology to build database networks of environmental, resource and economic parameters.

To date, the funding for these databases has been achieved primarily through special project allocations of pooled resources from several program departments. However this is not the traditional way of financing infrastructure. ***Government supported infrastructure such as transportation has been supported through economic development and job creation programs based on the recognition that financing infrastructure to meet short-term political objectives can create long term economic benefits.*** If Canada's future depends on environmentally sound economic strategies for the development of its resources and if primary economic growth is achieved through the information intensive industries then it makes sense to invest economic development and job creation resources into building the information infrastructure, i.e. building database networks instead of, or as well as, building roads.

Building and networking databases can benefit from the current high-tech low skill technology currently available for data entry, processing, storage and retrieval. Indeed, several offshore countries are developing this type of business strategy. Over 4000 jobs have been created in Jamaica in the data entry business. Thirty offices on six different islands in the Caribbean provide data entry expertise for the airline industry. ***Not since the development of the electrical infrastructure that supports the modern electronic age have governments been faced with the challenges of creating a new infrastructure to support the important information industry and the application of that industry for environmentally sound economic development of Canada's resources.***

4. Value-Added Products and Services

Who are the producers that can and will use the infrastructure? They are the environmental scientists, consultants, economists, resource developers and decision makers that add their expertise to the common information base. They need simple access to databases that will allow them to research, integrate and evaluate data from the perspective of their own discipline. They do not need to, nor can they afford either the time or the financial resources to re-invent or re-build databases each time they want to conduct a study or provide a product or service. In fact, the timeliness of their product or service is often essential to their work. Decision makers in response to an environmental disaster or a political debate may not be able to afford the luxury of time to develop the comprehensive information base if no supporting infrastructure is in place to provide it. Simple low cost access to a comprehensive information infrastructure is fundamental to the efficient production of useful information products marketed in a competitive environment. Government support for the value-added information industry is usually in the form of consulting and professional services contracts. The same kind of products and services are also needed by the resource development industry.

It is impossible to predict the number and type of value-added products and services that will be marketed based on comprehensive database networks. Any prediction would undoubtedly be an under estimate. However, it can be predicted that the countries that can make informed decisions based on policies that expand their environmentally sustainable resource base will have the competitive edge.

5. International Markets

The aerial mapping experience was used earlier as an example where scientific and technological expertise was developed in Canada to meet Canadian needs and then exported to other countries requiring that expertise. It is worth noting the organizational model that facilitated that development. First, the technology or tools were developed. In this case aerial photography and photogrammetry were the principal technologies. Then a mapping program for Canada to meet Canadian needs was undertaken, government driven by a program department and contracted to several companies in the private sector. This provided the basis to develop expertise in the private sector in all areas of surveying and mapping. On-going support in research, education and training was provided by the university sector. Finally CIDA, as a strategic funding department acting in response to requests from Developing Countries, used this expertise in their external aid programs and consequently provided a crucial role in positioning the Canadian companies to market their expertise internationally.

Like the surveying and mapping industry, an industry will develop out of the need for integrated environmental, economic and resource data in support of sustainable development. CIDA, the World Bank and other aid agencies are adopting new policies in response to global concerns over sustainable development. There is a growing need and hence an emerging market for the expertise as outlined in this paper. This is not the expertise of the global planners and policy makers that influence the decisions of governments. This is not the expertise of the educators, scientists and specialists who articulate the issues of environmentally sound economic planning although these are all needed. ***It is the expertise that is needed to collect, process and map a wide range of environmental, resource and economic data in a way that facilitates ease of access by government, industry and non-government users in support of informed decision-making. In short , the expertise necessary to build the information infrastructure.***

6. Conclusion

At the outset of this paper it was stated that the stage was set to move from the exploratory level of environmental science to the systematic surveying, mapping and infrastructure building for the environmental, resource and economic databases that are needed to support informed decision making. Currently the majority of databases that have been collected by government are structured, stored and maintained to meet specific program needs. Efficient access to this data by other governments or industry is difficult and integrating these data sets presents many problems of location, accuracy and classification. In order to develop a comprehensive common database network for a wide variety of users, it is necessary to systematically collect multiparameter data sets and transform these databases into an infrastructure based on common standards, networking and simple third party access. Two primary technologies or tools that are necessary to build this infrastructure are now available. GIS technology facilitates the integration of geo-related data bases and high-speed data communication to network these large volume databases.

Finally, the most important factor is that as a result of the multitude of studies, conferences and task forces, there is a raised level of public awareness and concern that makes it politically possible for politicians and senior decision makers to finance the necessary programs. Mission oriented departments are now reorienting their programs to support environmental issues in some cases through pooled resources for special projects or directly as part of their ongoing programs. Although to date budgets don't always reflect it, contracting out policies do support contracting out some or all of the work to private sector companies. A second form of financing will be from economic development and job creation resources. The third form of financing that creates business opportunities is through the production of value-added products and services which will be required by those involved in the informed decision-making process.

Finally, the Canadian model to build this industry can be patterned on the aerial photography and photogrammetry program which was implemented as part of a comprehensive mapping program for Canada and was government driven but carried out by the private sector. As this industry grew it was able to market its expanded expertise, products and services internationally mainly in support of aid programs to developing countries.

TITLE: Financing For Sustainable Development
SESSION: A.7
BULLETIN NO.: 10

TONY CASSILS

Changes to two areas of the tax structure can accelerate the implementation of sustainable development, said Tony Cassils.

First, an expanded sales tax can be designed to favour environmentally beneficial products and services.

Second implementation of sustained development programs will require large amounts of investment capital. To attract this capital the tax structure can be changed to provide incentives for money to shift to environmentally sound investments.

Possible investment instruments included disposal sales taxes which could be applied against products which are inherently wasteful, i.e., paper diapers; environmental venture capital funds to help finance new businesses which attempt to integrate economic and environmental concerns; and, tax-free environment bonds which could be issued by municipal governments to finance improvements to their infrastructures.

Finally Cassils noted that by embodying the concept of sustainable development in a structure as pervasive as the tax system, government could build momentum for positive environmental change in Canada.

JOHN GRAY

John Gray noted that pricing policies have an important role to play in implementing sustainable development. Prices can be more flexible, responsive and financially sustainable than regulatory approaches in many circumstances.

Prices influence the efficiency of consumption, the rate of production versus conservation and the use of different grades, qualities or locations. Pricing policy also incorporate non-market, social or environmental values and can be used to guide the intensity of resource management thereby influencing the sequence of production over time and its sustainability. Finally prices affect the financial sustainability of resource production for the owner.

Gray identified seven alternative resource pricing strategies noting that each was designed to meet a number of alternative objectives.

The alternatives included: value pricing according to consumers' willingness to pay; profit maximization; economic cost pricing to reflect the full economic costs associated with production; marginal cost pricing; cost recovery pricing; replacement cost pricing; and resource management incentive pricing in which prices are set to further a specific objective.

KEN PIDDINGTON

Mr. Piddington stated that we can use economics more dynamically in reaching environmental objectives but there may be circumstances where direct intervention is necessary.

As a component of its development role, the World Bank prepares environment issue briefs for each client country. Should the country's government agree that environmental issues need to be addressed, a number of alternative financing instruments could be drawn upon, including: the initiation of special projects in the area; the development of more comprehensive action plans; and sector loans. The objective is to constructively resolve the issue.

Piddington noted that it is a long term process. For the developing world the adjustments will be major; but it will be a much more difficult adjustment for the developed world.

DISCUSSION

- Using the taxation system to pursue sustainable development objectives is susceptibility to political pressures which reflect objectives, which may be inconsistent with sustainable development.
- Discussion focused on the ability of third world countries to enforce taxation legislation; and the relevance of pricing policy in countries without convertible currencies.
- The government sector's financing of sustainable development and the appropriate mix of policies could be expected to differ between the developed countries and the developing nations.

FINANCING FOR SUSTAINABLE DEVELOPMENT

J. Anthony Cassils

Vice-President, C.F.G. Heward Investment Management Ltd.
Suite 1630-630 René Leveque Blvd. West
Montreal, Quebec M3B 1S6

Introduction

It has long been a source of wonder to me that the human population should press against the limits of our administrative ability and the carrying capacity of the planet. If we could stand back from the abyss, reduce our population and pollution, all people could have plenty and we could live in balance. Perhaps we are part of an experiment to see if there really is intelligent life on earth, or are we as termites destined to build our mounds in darkness. We have reached a turning point.

Throughout history, we have focussed our values and institutions inward on ourselves. No major turn in human history has occurred without first changing the way we view the world. New knowledge leads the change. Recently, we have begun to recognize some of the appalling environmental consequences of our actions. As a result, we may be changing our primary goal from growth without recognizing the end, to a goal of maintaining life on this planet so that we can continue to flourish. This awareness explodes our existing habits and institutions, and we will need to rebuild all that we do in light of this new understanding. It appears that we are moving from one age to another, from the Age of Heroic Materialism to the Age of Ecology. Such transitions are never easy.

We will have to re-examine our structures and institutions. This presentation considers some changes in the tax structure for the purpose of accelerating the implementation of sustainable development. The tax system can help us: set new parameters for the marketplace; raise financing; and, lead ourselves into a new age. This paper will set the historical context, review tax and the marketplace, consider a tax policy for sustainable development, examine some options, and touch on international competition, leadership, and the process of change.

So that we share a common base of understanding, development is sustainable when it meets the needs of the present without compromising the ability of future generations to meet their own needs. In the short-term, it requires rapid and cleaner growth worldwide in order to meet the basic needs of all people, with the expectation that this will bring the population and our demands upon the planet into true balance sometime in the next century.

The concept of sustainable development was proposed by the Report of The World Commission on Environment and Development which recognized that developed nations cannot sustain many of their current practices, that poverty is environmentally damaging as the poor cut and burn forests or overgraze land, and that we can continue to have growth of a different quality although there are absolute limits. The Report assumes that we will attain sustainable development by meeting the basic needs of all people, and by promoting values that encourage standards of consumption that are within the bounds of the ecologically possible, and to which all can reasonably aspire.

We have two choices. We can do little and our economy will stall and go into a free fall, or we can move towards sustainable development. Sustainable development is the only acceptable option. It is based on common sense. It is inevitable.

Government must continue to lead the drive towards sustainable development. As the need for change is urgent, we have to be practical and use all available tools. This requires reshaping laws and institutions in order to nurture sustainable development. Each action sends a vital signal of change and shapes public opinion and personal habits. Government at all levels in Canada has introduced tougher legislation to protect the environment. This is a good start, but with tax reform, government has a unique opportunity to create a tax system favouring the environment with emphasis on an expanded sales tax. Unfortunately, the current tax system encourages many unsustainable practices, for example, in agriculture, forestry and mining. To make matters worse, most of our existing infrastructure of roads and buildings was built on the assumption of cheap natural resources and is expensive to operate. The extravagant abuse of the environment and large government deficits find common roots in values lodged in the short-term; the tax system can be designed to resolve both problems. We need to wrestle the pendulum from the unsustainable to the sustainable. During this time of crisis, we cannot remain neutral, and neither can the tax system until we have achieved sustainable development. Otherwise, we may not have an economy worth taxing. At the same time, government must raise sufficient revenue in order to reduce deficits; all suggestions are made with this need firmly in mind.

Some people are uncomfortable with the idea of designing the tax system for purposes other than raising revenue with a minimum of disruption to the market economy. The tax system has been the subject of assaults in the past by various special interest groups. However, the environmental crisis is unlike anything we have confronted before. It is not the cause of one special interest group, it is our common future. The tax system can be designed to help diminish and recapture some of the environmental costs. The measures must be well thought out and clearly focussed.

Once we agree that the tax structure is a useful mechanism for implementing sustainable development, the number of things we can do, is almost infinite. The ideas developed in this paper are not intended to be prescriptive. As the concept of sustainable development is a new departure for us, we need to join together to think it through, for it is in the process of developing and pursuing ideas that we come to an understanding of what is practical, possible, and worthy.

Taxation, An Historical Perspective

While Government in Canada has often been bold in public policy, such as with the construction of the transcontinental railway and the development of the welfare system in the decades following the Second World War, it has been more circumspect in designing the tax system to attain important goals of public policy. There are good reasons for this. Taxes are not only as certain as death, but rank at the same low level of popularity. As taxing can be hazardous to the health of governments, it is not surprising that governments have approached it with a high degree of caution. As a result, taxes were added piecemeal, and wherever possible, were indirect.

In Canada, during the period preceding the First World War, over 70% of Federal revenue was raised by customs duties and 14% by excise taxes. Most direct taxes were levied at the provincial and municipal levels in the form of sales and property taxes. It took the darkest year of the First World War, 1917, for the Government of Canada to gain enough courage to introduce as a "temporary measure", direct taxes on personal income and corporate profits. As an aside, the highest tax bracket for income tax in 1917, was 13%, and was intended as a tax on the elite.

The depression of the 1930's and the Second World War gave rise to the perception that government should become more involved in stabilizing the economy and in the regulation of the marketplace. By 1945, the Government of Canada had moved into a broadly based income tax. During the post War boom, government expanded public services and taxes with the consent of the public, for after two world wars and a great depression, people wanted to be protected from hardship. In the late 1960's, we began a binge of consumption. As we consumed more, we invested less, and our growth in productivity, fell.

Policy makers realize that, faced with intense international competition, Canada will have some difficult adjustments to make, and the emphasis on fairness in the tax system, has been displaced to a considerable degree by the need for economic efficiency. The tax structure has become a politically attractive issue because many Canadians find the system complex, business recognizes the need for tax reform, and the Government needs more revenue desperately.

The recent White Paper on tax reform had five broad objectives: fairness; competitiveness; simplicity; consistency; and, reliability. These are the classic objectives of tax. They focus on the relationships among people and their institutions. It is often said that the greatest threat to an industry or a system comes from outside the system. The environmental imperative explodes our structures and practices by adding another dimension, the relationship of human society to all living things. This opens a whole new realm of possibilities for the tax structure.

In 1986-87, income tax contributed 45% of Federal revenue; corporate tax, 11% ; unemployment insurance premiums, 10%; with most of the remainder coming from sales taxes, customs and excise duties, and return on investment. Meanwhile, two profound changes are rising to the surface of tax policy: first, the burden of taxation is shifting from income to sales taxation; and secondly, policy makers recognize the need to encourage savings and investment in order to reduce the cost of capital or interest rates, and increase national productivity.

Tax and the Marketplace

The accepted economics of the day always seems to be fighting the last war. The economist, Friedrich Hayek, is ninety years old this year, and journalists are extolling the victory of his theories over the evils of collectivism in the socialist mold.

It appears people can deal best with scarcity when production is in private hands, the consumer has the freedom to choose what to buy, and there is open competition in the marketplace. The less encumbered marketplace has clearly outperformed the controlled marketplaces of eastern Europe, and some leaders of Communist countries are acknowledging this fact. The term "market forces" is talked about in reverent tones by many people. However the marketplaces of states like Japan and Korea have a high degree of government involvement and the freedom of the consumer is constrained by cultural values. No one would argue with the international success of the constrained marketplace called Japan. Meanwhile, modern industrial countries have dealt so effectively with the scarcity of food, manufactured goods and services, they have created new scarcities of clean earth, clean air and clean water. Therefore, future economic growth will depend on the capacity of the environment to absorb it. We need new theories of economics, for the old ones are past their prime.

The "market forces" have met some individual wants quite well, but also, they have created great poverty. These same forces have an opportunistic quality which over time, often seems to push beyond the limits of the acceptable, for example, the sale of oil products contaminated with PCB's. Economic theories usually take for granted the importance of cultural norms in determining the economic success or failure of nations. West Germany and East Germany are both productive industrial economies, even though they are based upon opposed theories of the marketplace. Both Brazil and the United States had the resources of continents before them, cultural values made the difference. Individual self-discipline and shared values in a society seem to be critical determinants for its economic success. The health of the environment is an issue in which all people can find common cause. Therefore, all people should be instilling the environmental ethic in their young, because the health of the economy and their lives depend upon it.

The tax system can help to set the parameters for the marketplace and guide the behaviour of individuals. The core challenge is to move from an economy that has not considered the environmental costs of its actions to one that does. This will require major restructuring and a redirection of financial and intellectual capital.

Any tax is an interference with the marketplace. If government could operate businesses itself and make a profit, it would not need taxes, but it is not in the nature of government to run profitable businesses, but to provide leadership and operating parameters for the marketplace. The "marketplace", like all economic tools, is a means to an end, and the term itself is changed depending on whether we sanction the activity. If we do not like what it does, we call it the underground economy, the black market or the drug trade. The marketplace operates with a degree of anarchy that allows participants to feel pleasure or pain depending on the size of their profits or losses. This dynamic process allows economies to adapt quickly, but the marketplace has no sense of direction or values beyond the bottom line. It is the duty of government to set goals.

Tax policy tends to fluctuate between the concepts of a neutral tax and a just tax. The neutral tax seeks to have the hand of government take only what is needed to maintain itself, and to tax evenly, so as to cause a minimum of disruption to the free market. The just tax is based upon the need to achieve some agreed upon social ends, and the amount of tax is determined by the ability to pay. The neutral tax has much to commend it, and is clearly superior to the current tax incentives for unsustainable practices. However, we do not have much time and must use the tax system to encourage companies to introduce more efficient and less polluting technologies, and to change some of the habits of consumers. The tax pendulum must swing from supporting unsustainable development to supporting sustainable development before achieving neutrality.

The challenge will be to set new parameters for the marketplace without burying it in bureaucracy, to channel the market forces rather than stifle them, and to build environmental standards and self-discipline into our culture.

Sustainable Development and Tax Policy: The Design

By reforming our structures, whether it is the way we collect garbage or taxes, we can create a climate which provides more opportunities for business to practice sustainable development at a profit.

As we design a tax system for sustainable development, we must keep our goals clearly in mind. We will need to increase productivity, because there is a huge demand for necessities in the developing nations. We will need to achieve fairness by ensuring that the means of production and the products, reach those in need. We must produce more using fewer natural resources and with much less pollution. The tax system should reward individual initiative, but discourage environmentally harmful practices. Government will require sufficient revenue to run its operations without incurring huge deficits.

Environmental needs and the concept of sustainable development are catalysts that will encourage the shift in the tax burden from income to sales taxes, and the creation of more incentives to save, just as earlier in this century, war and social change compelled the development of taxes on personal and corporate income. These trends will become apparent with each Federal budget, and are more advanced in some other countries such as France, where the value-added tax collects twice as much revenue as personal income taxes. The value-added tax is a type of sales tax levied at each stage of production.

The beauty of the tax system is its pervasiveness. It can reach almost everybody on a daily basis. It can address the core challenge of moving from an economy that has not considered the environmental costs of its actions to one that does. Our economy has operated on a linear basis, taking in raw materials, which are refined and processed, manufactured and consumed leaving a trail of waste at each stage of production and after consumption. Now, we recognize that the biosphere is a closed system which can no longer tolerate our current business methods and lifestyles. We need to reshape the economy from the linear to the circular, whereby there is little pollution and extensive recycling. Taxes can make it more expensive to use virgin raw materials, cheaper to recycle; more expensive to pollute, cheaper to invest in more efficient methods of production; taxes can expose the environmental costs of the convenience of throwing away, and the true costs of our love affair with the automobile. The expanded sales tax offers government a wonderful opportunity to affect the day-to-day behaviour of consumers. It can be designed to favour environmentally beneficial products and services. By reshaping the behaviour of the consumer, it is possible to reorient the production of companies. The sales tax could be progressive, for example, people buying cars could pay a 10% tax on the first ten thousand dollars of the price. Any amount over that price would be subject to a rising scale that might be as much as 100% for a $100,000 car, thereby including in the sales tax, the "ability to pay" principle. A higher tax could be levied on cars that are not fuel efficient.

The sales tax has other advantages. It is voluntary above a certain level of subsistence, it encourages savings, it is easier to enforce than the income tax, and the burden of administration is passed from the public sector to the private sector. There is an element of privatization in it, although this will not be welcomed by business. Many European countries have made the adjustment.

The Government may wish to render much less significant, taxes on personal and corporate income, given the amount of energy taken to collect and avoid these taxes. For example, a flat 10% tax, both federal and provincial combined, could be levied on all income from whatever source. The tax would raise a considerable amount of revenue, would be very simple, would not be so high as to encourage elaborate plans for tax avoidance, and would recapture some of the underground economy. Additional revenue would be raised by the expanded sales tax. The nominal income tax would allow government to identify those people requiring assistance, and they could be given a rebate to compensate them for any regressive aspects of the sales tax.

Moving from an economy which is not sustainable to one that is, will require large amounts of capital. It is imperative that the tax structure provide many incentives to increase savings or capital. As the supply of capital increases, interest rates come down. Lower interest rates will encourage new investment world-wide and speed the economic restructuring essential for the implementation of sustainable development. Increased savings will supply the financing necessary to eliminate deficits, reduce pollution, care for the aging population in the developed countries, and assist the developing countries which will experience a rapid increase in growth and demand. Investments in developing countries have the potential to provide huge returns. The challenge is to put purchasing power in the hands of those who need it on a global scale, in the same way that purchasing power was put into the hands of the poor within many developed nations during the depression of the 1930's. We need a

"New Deal". One challenge will be to provide a reliable, well-administered international securities commission that will permit people to invest with confidence in countries located in the less developed regions of the world. This will permit the next major flow of capital to developing countries to go in the form of equity, not debt. Equity has the advantage of distributing risk among the shareholders, and unlike debt, does not carry high and fixed costs.

Some Specific Environmental Measures

As we develop our thoughts for designing a tax structure for sustainable development, it is useful to consider some specific proposals recognizing that the choice is infinite. Each step, taken successfully, will build momentum and signal change.

An emergency environmental fund could be established and financed by a modest one-time levy on corporate profits or by an individual surtax. The cost would then be charged back to the polluters representing a liability in financial statements. As science identifies in increasingly specific terms, the sources and total costs of different types of pollution, the standards will rise and polluters will face not only high fines, but the costs of cleaning up, costs with the potential to put them out of business. Over the longer-term, a sustainable business will be one producing few if any pollutants.

A disposal sales tax could be applied to certain products which are inherently wasteful, such as paper diapers or difficult to dispose of, such as tires. The disposal sales tax on tires and other difficult items such as large home appliances, would be refunded at the end of the useful life of the product. These taxes would reduce the amount of waste which is a concern for all three levels of government, and would produce a surge of revenue.

Some **tax-assisted investment products** could be created in order to redirect capital quickly, and they should be phased out after a predetermined time period of, for example, five years. While tax incentives are sometimes criticized because they are a type of public expenditure not subject to the close scrutiny of the budgeting process, supporters argue that they provide more scope for the entrepreneur to act than, for example, a government grant, which involves more bureaucratic procedures. Undoubtedly, tax incentives distort the market, undermine the reliability of revenue collection, and often they reward effort rather than profitability. Some tax incentives have been used to promote growth in established industries. In the following examples, they would be applied to speed the integration of the environment and the economy, and would act as catalysts for change. As we need to change quickly, we need to consider all vehicles. It is likely that some tax incentives will remain as long as we have high levels of tax on corporate and personal income.

The following **investment incentives** would encourage the participation of the individual investor and encourage savings. As people participate, they will gain a greater understanding of the issues. This will reinforce the shift to sustainable development.

Environmental Venture Capital Funds - New businesses are a major source of jobs. However, it is difficult to raise venture capital in Canada. Many expect the integration of the environment and the economy to give rise to a new wave of industry. This will require large amounts of capital, and to increase the supply, government could give tax incentives to investors in **environmental venture capital funds.** Presently, most of the investors in venture capital in Canada are corporations, but the environmental venture capital funds could be sold in smaller units so that more individual investors could participate. The need for venture capital is evident. The challenge will be to shake it free from a society which has become risk-averse.

Venture capitalists will have many business opportunities as the cause and effect of pollutants become more clearly understood. For example, epidemiologists are beginning to identify certain types of pollution as carcinogenic. Those who develop products to remove damaging particles from air or water will help polluters meet and exceed rising standards, and over the longer-term, reduce the costs of health care.

Tax-free environmental bonds could be issued by municipalities to raise money for the construction, renovation or improvement of infrastructure essential to a healthy environment, such as sewage and water systems. This would permit municipalities to raise funds at rates considerably below the market rate of interest. The tax-free status for municipal bonds constitutes a transfer of funds from the federal and provincial levels of government to the municipalities. However, these transfers occur in any event and the funds are not always well spent, for example, the Olympic Stadium in Montreal. The issuance of the environmental bonds could be tied to specific projects like sewage systems, which are often ignored by the public and by politicians because they are not visible, and special provisions could be attached to reinforce a spending discipline. As some people might object that the tax-free feature benefits unduly those people in the highest tax brackets, tax credits could be offered instead.

Investment products could be created to reward companies with good environmental records and to punish others. For example, **flow through shares** could be adapted for environmental ends. In the last five years, this vehicle raised over a billion dollars for the mining and oil and gas industries, which pass on their tax deductions for exploration to individual investors. The investors buy units in a partnership, which, in turn, invests in companies undertaking activities qualifying for the favourable tax treatment. By adapting this vehicle to environmental goals, companies investing in pollution abatement equipment could be given substantial tax deductions which would then flow through a partnership, to the individual investors. The net effect would be to provide capital at a discount to companies, and tax credits to the investors. The largest companies can probably look after themselves. It is the medium and smaller companies that might benefit the most from this vehicle as they are often short of capital. As medium and small companies are also the major source of new jobs, and many of the companies pollute, the government may want to consider this and other tax options in order to help them adapt. To a considerable degree, an investment in pollution abatement will involve upgrading manufacturing equipment and this should increase productivity, the value of assets, and share prices. Another positive factor for share prices is that the investment in pollution abatement equipment would reduce exposure to penalties, which could loom quite large in the balance sheets of laggard companies in the future.

Provincial stock savings plans with an environmental twist could be created to help finance new companies associated with sustainable development, such as those pioneering new dimensions for recycling or creating environmentally friendly products or services. The Quebec Stock Savings Plan captured the imagination of Quebec, generated a surge of growth, and capitalized many small companies. The Plan gives deductions from Quebec taxable income ranging from fifty to one hundred and fifty percent of the amount invested in Quebec-based companies with the larger deductions applied to investments in companies with small capitalization. The Plan is viewed less positively after the sharp drop in the stock markets in October 19, 1987, since many small companies were particularly hard hit. Also, some companies included in the Plan, went public prematurely. However, the overall effect of the Plan has been positive, and after the next economic slowdown, rising stock markets will be more supportive of small companies seeking financing.

Moving briefly to tax related investment incentives for manufacturers, the **accelerated capital cost allowance** should be expanded to apply to investment in recycling technology as well as to pollution control equipment. Some applications under this provision have been refused because the investments recaptured useful products from the waste, and were deemed to be investments for economic efficiency. The distinction does not make a lot of sense in light of the goal of sustainable development.

To turn from tax assisted investments to other tax and financial incentives, let us start with agriculture.

Most developed nations subsidize unsustainable agriculture which erodes and poisons the soil and water. Since 1945, agriculture has moved from a "soil base to an oil base". Oil based machinery, fertilizers, and insecticides dominate the industry, creating problems with which we are all familiar, such as, concerns about the level of pesticides on fruit and vegetables and the loss of top quality farmland. The point is that subsidies and tax incentives should be redirected in order to finance the transition to sustainable practices, such as **organic farming**. The science of biotechnology is placing a high priority on developing crops resistant to disease and insects. Organic farming is becoming a real alternative. If this results in slightly higher food prices, an environmentally aware public will be willing to pay the price. The subsidies should be phased out as the transition occurs so that farmers in poorer countries will be able to compete.

Taxes on energy consumption are an obvious source for new revenue. Canada is one on the least efficient countries in the world in the use of energy. The standard excuses for this wasteful behaviour are that Canada is a cold sparsely populated country requiring the use of more energy, or that we have many industries which are heavy users of energy. There is a measure of truth to these comments, but anyone who has been trapped in rush hour traffic knows that we can improve the way that we use energy.

When energy prices fell in the early part of the 1980's, many governments considered that the energy crisis had ended. In Canada, government reduced support for renewable energy and let some of the reduction in the price of fuel, flow through to the public. This makes sense from the perspective of the market economy, but the "greenhouse effect" adds an entirely new dimension. Until we develop a substitute for fossil fuels, conserving energy is not just a factor of price, but essential to life. Highly polluting fuels such as coal and oil should be taxed more heavily than natural gas, and tax incentives could be reintroduced to encourage the insulation of buildings, and the development of renewable energy.

The **forest products industry** is a major source of wealth and employment in Canada, and yet, we are cutting four times as many trees as we plant. Practices in many other parts of the world are much more destructive. This is clearly unsustainable, and the effect will be to drive up the value of forested land in the next ten or twenty years. It makes excellent ecological and economic sense to plant many more trees now, because it takes from forty to sixty years to grow a decent forest in Canada. Stumpage fees and leases of Crown lands to industries producing forest products must reflect this reality.

Pension funds constitute the fastest growing source of capital. Governments should consider changing legislation governing investments by pension funds to allow greater flows to environmentally beneficial investment vehicles or businesses. Investing by pension funds is subject to restrictions, for example, investment in common stock can only include companies which have paid dividends during at least four of the past five years or had earnings of at least four percent of the average book value of the capital stock over a specified number of years. Seven percent of the portfolio may be invested in such things as venture capital, warrants, rights and stock options, which fall within a "basket clause". Companies resolving issues relating to the environment and the economy are sufficiently important to warrant the creation of an "environmental clause" that would permit pension funds to invest, for example, up to five percent of their holdings in companies deemed to be environmentally friendly. Many incentives could be provided, for example, by allowing a pension fund to invest two dollars outside Canada, for every dollar they spend inside Canada in an "environmental investment". Some people might object to this proposal on the basis that the managers of pension funds have a fiduciary responsibility to obtain the greatest return they can for their investors. This ignores the fact that , in Quebec, the Caisse de Depot has been a vehicle of provincial policy for many years, has been well managed, and has delivered good performance. Also, as conceived, the "environmental clause" would offer an opportunity but not an obligation. It is worth noting that in recent years, many waste management stocks have outperformed the general market by a considerable amount. With the obvious need and helped by financial incentives, environmental investments will provide many growth opportunities. Meanwhile, it is important to keep in mind that the proposed "environmental clause" would be another important signal of change.

Every country wants to **transfer** in new **technology.** The tax structure could encourage it by providing favourable tax treatment to foreign companies which bring environmentally beneficial technologies into the country. For example, Wellman Inc. is a medium-sized American company that, for years, has been recycling plastic materials and adding significant value, so that the end products come out in a form which is not only usable, but also highly profitable. They have proprietary processes and undertake continuing research. A recent investment report on Wellman commented on its subsidiary in Ireland where the tax rate on its operations will not exceed 10% until the year 2000. Giving tax breaks or grants to encourage innovative companies to bring their environmentally beneficial technologies to Canada may be cheaper than paying for places to dump the waste.

Measuring Pollution and the Margin of Safety - In order to create tax-related investment incentives for sustainable development, it is important to distinguish between those to be rewarded and those to be punished. One of the main concerns of regulators is that they do not monitor or measure pollution extensively enough, and when they do identify polluters, it is often difficult to assess the damage. This uncertainty creates a formidable barrier defended by scientists, lawyers and accountants, and makes it difficult to distinguish between the environmental offender and the model citizen. As a further complication, numbers can mean different things to scientists on one hand and to lawyers and accountants on the other. For example, scientists may use numbers as indicators of probability, lawyers and accountants expect them to be exact, giving rise to a potential for litigation. Government will need to monitor the sources of pollution much more closely in the future, and tighter regulation based on a profound public concern, should make compliance the norm.

Given the immediacy of the threat to the environment, we may need to act without the benefit of precise measurement. This has already begun to happen in the case of the production of CFC's. We may need to move beyond reason and analysis to judgement and intuition. This implies adherence to a principle of a margin of safety. For example, recently, a container of insecticide sank in the North Sea. Journalists noted that if the container opened, it would cause an unprecedented environmental disaster by destroying ocean life over a wide area and put many fishermen out of work. However, the insecticide was produced in order to be sprayed over land, whereupon it would flow into underground water tables and into many life forms. The question arises as to whether we should be using these chemicals at all, if we believe in the need to maintain a margin of safety.

Government can apply the margin of safety principle by levying fines against those who pollute. In this way, government will be able to behave in a more arbitrary manner, since it will only have to prove that the act of pollution occurred, and not the amount of pollution or the precise costs. In this way, fines can be very effective financial incentives for compliance, while providing government with another opportunity to raise revenue.

Where government does measure and monitor pollution from certain industries closely, it can tax more heavily, those that fail to meet the standards, and give tax credits to those that do. The effect would be to drive out the inefficient operator, and "inefficient" includes both the price of the finished product and the cost to the environment.

On a variation of this theme, Senators John Heinz and Timothy Wirth of the United States suggested some market incentives to keep the environment clean and simplify regulations in a Report entitled "Project 88". Government would set the total amounts of emissions permitted for certain types of pollution, with permits available up to those limits. Companies would buy and sell these permits as needed, and the price would rise with demand to the point where it would be cheaper to reduce emissions. This scheme has promise, but would require close monitoring in order to ensure compliance.

International Competition

The economy of the world is more interdependent than ever. As some pollution abatement costs may result in higher prices for some products in the international marketplace, there is a danger that the product with the lowest price will also become the lowest common denominator in terms of the environment. We will need to think of ways to resolve problems of this nature. Perhaps, we could include environmental standards within the General Agreement on Tariffs and Trade, so that products of heavy polluters would be subject to high tariffs, forcing them to comply with international standards. The World Bank is beginning to tie environmental conditions to some of its loans. If we put our minds to it, there will be many solutions.

Leadership and The Process of Change

The speed of change depends on the quality of leadership. At times of crisis, we need leaders, and we need to be leaders, with the courage to shape the consensus. Those who wait for the consensus to form are followers. We need to remember that when something becomes common knowledge, it may be too late.

At this stage, it is important to stand back and assess the tax system in the context of the process of change. At first change is sensed, then articulated, at which point, groups of supporters begin to cluster, similar to the environmental movement of the 1960's. Politicians catch the scent and they weigh the potential of the issue for attracting votes. Then change begins to encounter barriers created by those firmly attached to the existing structures. As change by its very definition starts outside established institutions, those who support it are looked upon as misguided idealists by those who say "show me how to make a buck out of it." If the issues are real, then public support grows, and government is forced to act. In the case of the environment, there was a period of the "phoney war" in the 1970's. Government paid lip service to the issues by passing environmental protection and assessment acts, which were not really applied. With the sequence of environmental bad news in the 1980's, government bared its teeth in the form of the threat of serious penalties. However, offenses are not always detected, and are sometimes overlooked. Raising the penalties for polluters was a good start; but legislators would create the critical mass necessary for profound change by designing the tax structure for sustainable development. This will create more opportunities for business, and the phenomenon of swarming will begin, as people rush to join the trend before they are left behind. This time, environmental concern will be more than a fad; and, changed structures such as the law and the tax system, must anchor it.

As the momentum for sustainable development builds, financial institutions will need to fund extensive restructuring and many new companies. Clients of banks will begin to request that their deposits be used for environmentally positive ends, and this could give rise to, for example, demands for environmental mutual funds and environmental deposit accounts. It is a matter of signalling change. As the issue becomes widely adopted, companies will indicate by means of new products and public statements that they are aware of the need to change. As capital flows into the new channels, eventually, customs and habits reform until sustainable development becomes part of the mainstream, and other issues will struggle to be born.

Conclusion

Many people have accepted the concept of sustainable development which is inevitable and based on common sense. Its implementation requires profound restructuring of our habits and institutions. Environmental crises have created a high level of public concern, and this has led to new and stricter legislation relating to the environment. At the same time, large governmental deficits and a complicated tax system have given rise to a cry for tax reform. The trends of tax policy are shifting the burden of taxation from income to sales taxation, and encouraging savings. These changes should be designed to accelerate the implementation of sustainable development. By embodying the concept of sustainable development in a structure as pervasive as the tax system, and eventually in all our structures and institutions, government will build momentum for positive environmental change in Canada.

We, in this country, and on this planet have started a voyage into a new age. It will shake our assumptions, offer great challenges, and provide many opportunities to improve the state of the environment and the quality of our own lives.

PRICING POLICIES FOR SUSTAINABLE DEVELOPMENT

John A. Gray

Department of Economics, University of Manitoba
Winnipeg, Manitoba, Canada, R3T 2N2

ABSTRACT

Resource pricing policies have an important role in sustainable development. Prices can be an important tool of natural resource management. Pricing policies can influence resource use, consumption or production, influence the use of resources in different locations, and the use of different grades.

Pricing policies can be a useful tool of environmental management, often better than regulations. Pricing policies can incorporate social, environmental or other non-market values. Pricing policies can encourage conservation by influencing the rate of use of resources over time, long term resource supply, and therefore resource sustainability. Finally, pricing policies can serve to ensure that resource projects and programs are financially sustainable, and distribute the costs among the beneficiaries.

In exploring the scope of resource pricing policies, seven alternative pricing policies are identified; value pricing, revenue or profit maximization pricing, economic cost pricing, marginal cost pricing, cost recovery pricing, replacement cost pricing, and resource management incentive pricing.

Selected examples are introduced to illustrate the range and diversity of resource pricing applications. The examples include; water pricing, municipal water rates, transferable discharge permits, emissions fees, sewer surcharges, leaded fuel taxes, deposit-refund systems, an application to acid rain, and a proposal of a deposit-refund system for toxic wastes.

Prices and Resource Management

The theme of this paper is that prices and pricing policies for natural resources have an important role in achieving and financing sustainable development.

For marketed goods it is acknowledged that prices can work well to guide and influence production, consumption and use, allocate resources, and finance production of marketable goods and services in market oriented economies like Canada.

It is also well recognized that prices and market systems work less well, or even fail to function in a number of situations.

Traditional markets and prices fail where goods, services or activities are of a collective or community, rather than an individual, nature. Such "public" or collective benefits are not saleable and so normally lie outside traditional markets and pricing systems.

Where external benefits or costs to third or fourth parties are generated by production or consumption, traditional markets and prices again fail. Market prices can reflect only the private costs and benefits. The external costs of pollution are the most prevalent negative externality and misallocation. Positive externalities are less common, even rare.

A Role for Pricing Policies

Recognition of these omissions, gaps or failures in markets and in prices often leads to a quick rejection of pricing policies in resource or environmental management, and instead to adoption of regulatory approaches. Yet regulations and regulatory approaches are often rigid, inflexible, short-term solutions, and are not usually financially sustainable.

Pricing policies on the other hand, can be more flexible, responsive, and financially sustainable.

This paper argues for greater use of pricing policies. It argues that prices and pricing policies can play an important role in resource and environmental management. It argues that resource pricing policies should be central to long-term sustainable development.

Functions of Resource Prices

Prices can be an important tool of natural resource management. Resource pricing can serve several functions. First, prices can influence resource use, encouraging or discouraging consumption, encouraging production or conservation , or encouraging production or use of different grades, qualities, or locations.

Second, prices can incorporate other non-market values - social or environmental values. They can serve to reflect and correct for external costs or benefits.

Third, prices and pricing policies can be used as a resource management tool, embracing these first and second functions to manage the production and consumption of resources.

Fourth, pricing policies can influence the sequence of production over time, the rate of depletion, conservation or rebuilding of resource stocks and flows, in short the sustainability of resource production .

Finally, prices and pricing policies affect revenue flows and therefore the financial sustainability of resource products and programmes.

Each of these functions is illustrated by selected examples which demonstrate the range of pricing effects.

As with any set of tools, it is important to understand the scope, uses and limitations of resource pricing policies. Sometimes these resource pricing effects are not fully appreciated, and consequently pricing decisions have unanticipated or unintended effects.

1. Pricing Effects on Resource Production and Use

Pricing policies and prices can have significant effects on resource production, consumption, use and conservation. The size of the impact depends on the price elasticity (the price sensitivity) of demand and supply.

The response of consumers to oil price increases of the early and late 1970's is well documented. Consumption dropped dramatically. The elasticity of demand is dependent of the substitution possibilities. Interfuel substitution is now well understood. The elasticity (sensitivity) of supply to the price increase is also well understood. Exploration activity, development well drilling, secondary and tertiary recovery responded to these 1970's price increases, and later to the decline in price.

Water metering which involves a marginal price on domestic and commercial water use, has been shown to reduce water consumption substantially from non-metered (zero marginal price) use. Water consumption in Canadian cities that use metering is substantially below that of cities without water meters.

Fishing or hunting licence purchases are influenced by the level of licence fees. Differential licence fees among licence types can shift hunting or fishing activities among uses. Differential licence fees between residents and non-residents can influence the financial contribution of each as well as affect use.

Stumpage prices can influence timber harvesting, and differential rates among species can influence the rate of harvesting of individual species.

Royalties rates on minerals, oil and gas can influence the rate of production or the operation of marginal mines or wells.

An understanding of these pricing effects is necessary if pricing policies are to serve to influence the pattern of resource use, production and consumption. and to avoid any unintended, unplanned, or surprise impacts.

2. Pricing to Reflect Non-Market Values

Pricing policies can also serve to reflect the non-market values. For example, park entrance fees might be set to reflect the value to users.

Waste disposal charges can reflect the pollution externalities involved. Emission fees on air or water emissions can both reflect the external damages of emissions and serve as an incentive for treatment.

3. Prices as Resource Management Tools

Prices can have important effects on how natural resources are used, and so pricing policies can be an important tool of resource management. The examples above illustrate a few of the ways in which pricing policies can serve as management tools. There are many other opportunities in individual resource management situations.

4. Pricing policies and the Rate of Resource Use Over Time

Resource prices affect the rate of use and consequently the rate of resource depletion of stock resources such as minerals, oil and gas, old growth forests, and tropical timber. On the one hand higher prices dampen demand and reduce consumption. For some resources, higher prices will encourage recovery and recycling. Higher prices also stimulate improved recovery methods and make more marginal deposits, or timber stands, economic. Higher prices stimulate exploration activities to search out new deposits. Finally, higher prices stimulate research into improved utilization, better recovery, improved exploration, and into the development of substitutes.

5. Prices and Financial Sustainability

Financial sustainability is an important factor in sustainable development. Prices not only influence resource use, they also generate revenue. Revenues generated can be used to finance resource management, resource renewal, reforestation, etc. and so ensure the long-term production and sustainability of resources. Depending on the level of prices, the revenues may cover management costs or may even generate a revenue surplus.

Alternative Resource Pricing Policies

Resource pricing policies are sufficiently flexible that they can meet a number of alternative objectives. Seven alternatives are identified here. Each is discussed in turn.

1. Value Pricing

Prices can be set to reflect the demand for the resource or resource commodity. If a market for the resource exists prices that reflect market demand can be established through market forces, perhaps using auctions or sealed tenders to establish prices. Such pricing arrangements are analogous to commercial market pricing in the private sector. Auctions of mineral or oil and gas leases or of timber stands are examples. Where warranted, resource management should be as business-like as possible conforming to commercial objectives.

Where no markets exist, values and prices may be derived from the marketed commodities produced from the resource, and prices set to reflect these derived demands. For example, the value of water for irrigation may be derived from the market value of the crops, less the costs and normal profits involved in producing the crop. For hydro power the value of the water used may be derived from the price of the electricity produced, less the costs of generation and transmission.

2. Revenue or Profit Maximization Pricing

The resource management agency may seek to adjust both prices and resource production to maximize either its total revenue or the total profits (revenues less costs). In this case it is operating like a revenue or profit maximizing private sector monopolist.

3. Economic or Full Cost Pricing

In the first two alternatives, pricing policies parallel those of the private sector. In this third, prices would be set to reflect full economic costs, that is both market costs and non-market costs; externalities and foregone opportunities. Thus, for example, if resource production would involved pollution or other environmental impacts, resource outputs should be priced to reflect these external, social costs. Prices would then reflect the full opportunity costs.

4. Marginal Cost Pricing

Marginal cost pricing is an alternative which has gained increased interest among public utility operations; water utilities, sewage systems and particularly electrical utilities. Marginal cost pricing involves pricing policies and rate structures designed to reflect the incremental or marginal cost of additional output (electricity, water, or sewage). Where excess system capacity exists, marginal cost can be quite low, so that pricing policies would encourage use of the available capacity. Where demand is near capacity, additional consumption can involve quite high capital costs of system expansion. In this case marginal costs would be high and marginal cost pricing would therefore involve higher prices that would constrain demand and postpone expansion.

Peak-load and off-peak pricing policies represent an extension of marginal cost pricing policies to situations in which fluctuating daily or seasonal demands are experienced. Peak load pricing is a demand management technique of application to utilities and also to many resource management situations.

Marginal cost pricing can be based either on financial (i.e. market costs) or on economic costs which embrace both market and non-market costs (including environmental costs).

5. Cost Recovery Pricing

Resource pricing policies may set prices to allow the recovery of the historic cost incurred in their management and in their renewal.

Rate of return pricing is an application of cost recovery pricing commonly applied in the regulation of public utilities. Rate of return pricing usually allows recovery of historic costs, interest costs, and a normal rate of return on the invested capital.

Cost recovery pricing might be applied, for example, in forestry, by setting stumpage prices of timber cut to recover the costs incurred in past reforestation and forest management activities. For water resource projects water prices might be set to recover project costs and operating costs. Fishing licence fees might be set to reflect restocking and fisheries management costs.

6. Replacement Cost Pricing

Rather than looking backward to recover historic costs incurred, pricing policies could instead look forward with prices set to cover replacement costs.

Replacement cost pricing can also incorporate allowances for interest costs and a normal rate of return on the capital investment, as in public utility pricing and regulation.

Replacement cost pricing could be applied, for example, to forestry to set stumpage prices on the timber to cover the costs of reforestation of cut-over areas after harvesting, and the anticipated costs of managing the newly established stands.

Replacement cost pricing is therefore a means of ensuring the future financial sustainability of the resource.

7. Resource Management Incentive Pricing

In incentive pricing, resource prices are set with the objective of influencing resource utilization, resource management and the utilization of the resource. For example, in resource management prices can be set to encourage the utilization of certain species of fish or of trees, certain grades of ore, or of oil and gas, resources from certain locations, fish in certain lakes, oil or gas from certain wells, etc. For example, a fish marketing corporation might pay higher prices for certain under-utilized species to encourage fishermen to fish those species. Low prices might be offered for species that are overfished to reduce fishing pressure on those fish stocks. The opportunities for using pricing policies for resource management are broad.

Resource Pricing Examples and Applications

There is a wide array of resource pricing opportunities and applications. Examples cover a full range of natural resource, environmental and development applications. Only a few are highlighted here. A survey and comparison of resource pricing applications is a study in itself.

Water Pricing and Municipal Water Rates

Water pricing for demand management of water and sewage services was recommended by the "Inquiry on Federal Water Policy" in 1985 and embraced by Environment Canada. The Honourable Tom McMillan discussed water pricing in the opening session of this conference.

Municipal water pricing across Canada was recently surveyed by Environment Canada. Where water use is not metered (a flat rate is charged) water consumption is significantly higher than in municipalities in which water use is metered and priced by consumption. High consumption in non-metered municipalities can impose high costs on the water utilities, especially where expansion of facilities is required, and lead to higher water bills for all consumers.

Water rates can influence water consumption and conservation.
Water rate structures across Canada reflect a diversity of approaches. Flat rate (non-metered) and declining, constant, and increasing block metered rates are found. They have differing effects on consumption.

Transferable Discharge Permits

Transferable discharge permits are a quite a different example of resource pricing. They have been used successfully in water quality management in a few U.S. river basins.

Under transferable discharge permits, water quality standards and the total permissible level of waste discharges are first determined. The permissible maximum volume of waste discharges is then allocated among individual polluters (industry and municipalities) usually based on waste volumes generated. Each polluter is issued a discharge permit for a maximum waste volume, rather as in the usual regulatory approach. However, in this case, the permit is transferable, and marketable. Firms which can treat cheaply, or which decide to put in better treatment facilities can recoup some of the cost by selling part of their transferable discharge permit to firms which wish to expand. By allowing their transfer, discharge permits take on a price and value. Treatment and stream water quality standards are met efficiently and flexibly at minimum cost. The arrangement is equitable; those firms who incur costs to improve their treatment can recoup their cost by sale of permits to others who choose not to.

Similar types of transferable permits for air pollution emissions are embodied in the U.S. Clean Air Act and have recently been proposed for reducing acid rain emissions.

Transferable permits or quotas are used in other resource areas; in forestry in Manitoba and Alberta; in fisheries management of several fisheries in several jurisdictions.

Emission Fees

Waste water effluent fees are used in a number of European countries, The Netherlands, France, West Germany, East Germany, and Czechoslovakia, for example; but not often in North America.

Systems simulation studies of several U.S. river basins more than 20 years ago suggested that effluent charge systems could be from two to four times more cost efficient than regulations in improving water quality, more flexible and fairer. Thus effluent fees would achieve water quality targets at one-half to one-quarter the treatment cost under the more commonly used regulatory approach.

Sewer Surcharges

Municipal sewer surcharges on heavy, above normal, sewage loads is another resource pricing example. Winnipeg has been a pioneer in such sewer surcharge systems. Winnipeg's sewer surcharge system has been in operation for over 30 years, since 1958. Surcharges are levied on individual firms on pollutants in excess of normal sewage (on organic wastes, suspended solids and certain other pollutants). Although originally designed to equitably share treatment costs among residents and industry, this waste "pricing system" has been effective in encouraging in-plant treatment, waste recover, process changes, waste water recycling, etc.

Leaded Fuel Tax

Manitoba's differential higher fuel tax on leaded gasoline represents another simple, yet effective resource pricing policy. By equalizing the prices of leaded and unleaded fuel it encourages use of environmentally safer unleaded gasolines. A slightly increased tax on leaded gasoline could make unleaded cheaper than leaded gasoline, and provide an even stronger incentive to use unleaded gasoline.

Deposit Refund Systems

Deposit-refund arrangements on beverage containers, are another quite different example of pricing policies. Alberta's beverage container legislation is a well established example. Deposits are charged on all containers, not just refillable bottles, and refunds paid upon their return to independent, privately operated collection depots. Recovery and recycling is encouraged. Litter and environmental damage is reduced. A new industry and new jobs have been generated.

Deposit-refund systems have been proposed and/or introduced elsewhere and for different containers - pesticide containers for example.

A Deposit Refund System for Acid Rain

A deposit-refund type system was proposed in the 1970's in the U.S. by the Nixon Administration to control sulphur dioxide emissions. It was to involve a sulphur tax levied on coal mined, with the tax per ton of coal based on the sulphur content of coal. The proposed surplus tax was to be rebated to thermal power plants, steel mills and other coal users based on the amount of sulphur recovered by scrubbers or other recovery systems. The proposed sulphur tax been was, in essence, a deposit-refund system. Had such a deposit-refund sulphur tax been passed by the U.S. Congress in the 1970's acid rain problems of today might not be so severe.

Deposit Refunds for Toxic Wastes:

Toxic waste control is perhaps today's most serious and growing environmental problem. Regulations are complex. It is difficult to keep pace with new toxins and difficult to enforce the regulations. Illegal dumping of toxic wastes is growing. Regulations impose high disposal costs on conscientious firms, and generate windfall profits for illegal disposal.

A deposit-refund system could be more efficient and effective than regulations. It would be fairer to the responsible firms and would take away the incentive for illegal disposal.

Deposits would be charged on toxic chemicals at production and repaid upon delivery of the toxic waste to a disposal facility. Firms which fully recover their toxic wastes there would fully recoup their deposit payments. For wastes not returned, unclaimed deposits would help to finance their recovery or treatment.

Chemical companies are thinking along similar lines. Some are considering leasing rather than selling chemicals to customers.

Further Resource Pricing Applications

There is considerable scope for new, increased or expanded use of prices and pricing incentives in resource management. Resource pricing policies are not only viable, they are usually more flexible, more responsive, cheaper, and often more equitable than regulations. There is therefore an important role for pricing in resource management and in sustainable development.

SUSTAINABILITY IN THE DEVELOPING WORLD

Ken Piddington

Director of Environment, The World Bank
1818th Street N. W.
Washington, D. C. 20433

ABSTRACT

The use of "sustainability" as a criterion for project financing is an issue being addressed by the World Bank. The Bank's view has evolved to the point where it sees objectives such as economic development, poverty reduction and sound environmental management as mutually consistent, and as reflected in the concept of sustainable development. The acceptance of these concepts has already had major effects on the Bank's project and policy activities. Some of the difficulties encountered in attempting a more fundamental incorporation of the basic principles of sustainable development into project lending as well as upstream into the Bank's policy formulations include technical issues such as the reliability of conventional economic analysis, and the quality of technical, scientific, institutional and sociological information. Ultimately, the Bank's obligation is to define with its borrowing countries the alternative courses open to them, while remaining responsive to each country's necessarily unique priorities.

TITLE: Achieving Sustainable
Regional economic
Development
SESSION: A.8
BULLETIN NO.: 11

ROBERT PRESCOTT-ALLEN

Prescott-Allen stated that because of the complexity and multiplicity of the issues involved, much of the effort to achieve sustainable development should be devoted to assembling and analyzing information, to achieving a consensus among communities and to reaching agreement with other interested parties.

Local governments, businesses, communities and interest groups should play a greater role in setting the agendas for economic development. The most promising means for them to achieve that objective is to develop sustainable development strategies at the provincial/territorial level, the regional/local level, or both.

He suggested that the next generation of strategies should combine conservation and economic development considerations.

SYLVIA SUTHERLAND

Sutherland said that unless there is an understanding of the issues of sustainable development at the local level of government, the achievement of the goals we are seeking at the wider national and international levels, will be hindered if not lost.

She outlined the response by the City of Peterborough to environmental concerns and described the manner in which the city is integrating economic and environmental planning. She reviewed the objectives, structure and activities of the Peterborough Committee on Sustainable Development which she believes to be unique in the province of Ontario.

MICHAEL DECTER

Decter said that achieving sustainable regional economic development requires a balancing of economic development and environmental considerations for which federal and provincial governmental machinery is not well designed. Environmental departments have been directed to regulate and economic development departments to create jobs. It will be necessary to provide more funding to environmental departments and to combine the mandates of the two types of department.

Decter said that regional development in Canada is about politics and jobs. Atlantic Canada and the West have relied on political leadership to supply jobs and incomes. He said that politicians have had to balance jobs against principles of sustainable development and that the Premier of any have-not province would be reluctant to sacrifice jobs because of environmental considerations.

DENNIS WALLACE

Wallace said that while his department's main objective is to promote economic diversification, it has acted to ensure that the activities which it supports are sound environmentally as well as economically. The assessment process involves the screening of each project in conjunction with Environment Canada to ensure that the activities which it supports are sound environmentally as well as economically to ensure that they meet federal, provincial and municipal environmental standards.

The Western Economic Diversification Office is involved in soil conservation; agricultural biotechnology; archaeological and heritage preservation as well as several projects aimed at exploiting new market opportunities for environmentally-related products.

DISCUSSION

- A question was raised regarding the Western Economic Diversification Office's promotion of low-sulfur coal from Western Canada.
- A questioner from southern Ontario asked how a local strategy is to be developed in the absence of a provincial strategy. Sylvia Sutherland said that it is better to proceed than to wait for the Province. Robert Prescott-Allen agreed, citing experience in British Columbia.
- A member of the audience observed that wide regional disparities are conveniently ignored when sustainable development is discussed.

STRATEGIES FOR SUSTAINABLE REGIONAL DEVELOPMENT

Robert Prescott-Allen

PADATA, 627 Aquarius Road, RR2
Victoria, BC V9B 5B4

ABSTRACT

Sustainable development combines ecological, social, cultural, and economic criteria. Some of the criteria can be objectively determined. Others are a matter of cultural and personal values. Hence, sustainable development calls for full participation of all interest groups in environment-development decisions.

Cominco's Red Dog mine in Alaska, and the Golden Spike sour gas project in Alberta, exemplify ways of achieving this at the project level. But much more is needed, including mechanisms to resolve (better still, avoid) environment-development disputes. Economic diversification and other factors will increase land use conflicts, unless effective procedures are adopted to integrate economic development and environmental conservation, coordinate sectors, and give local communities, businesses and interest groups a greater part in setting the agendas for development.

The 54 conservation strategies, in progress in 41 countries, provide the only body of practical experience on how to deal strategically with these issues. The Victoria Conservation Strategy (Australia) indicates some of the results such strategies can achieve. Five characteristics of a successful strategy are identified.

The next generation of strategies should be sustainable development strategies, combining conservation strategies and economic development plans; and should be undertaken at federal, provincial/territorial, and regional or local levels. The need for regional and local strategies in Canada is illustrated from Clayoquot Sound, B.C.

Sustainable Development Defined

Let's begin by admitting three facts about sustainable development:

Fact #1. Nobody's done it yet.

Fact #2. Nobody knows what it is.

Fact #3. Sustainable development is not a very good term for what we think we mean when we talk about sustainable development.

So what do we mean by it? Here is a definition:

Development is the process by which people meet their needs and improve their lives socially and economically. Sustainable development is a process of social and economic betterment that satisfies the needs and values of all interest groups, while maintaining future options and conserving biological resources and diversity.

Sustainable development is a complex concept, incorporating at least four principles, each of which is applicable in one way or another to all development activities:

1. Ecological sustainability requires that development be compatible with the maintenance of ecological processes, biological diversity, and biological resources.

2. Social sustainability requires that development help to maintain and strengthen community identity by increasing compatibilities and reducing conflicts among the different interest groups.

3. Cultural sustainability requires that development be compatible with the culture and values of the people affected by it.

4. Economic sustainability requires that development provide a sufficient return on investment to pay its own way, and provide the means of meeting human needs and improving the quality of life.

The concept of sustainable development is hard for some people to grasp partly because it is not explicable in terms of a single discipline, but largely because ecological sustainability as such is not the only concern. Also important are social equity, sensitivity to cultural diversity, economic viability, equality of economic opportunity, and so on. Thus, the term "sustainable development" does not fully describe what we say we mean by it. Maybe "authentic development" is a better term. One day, perhaps, we'll be able to use a simple word like development and mean all of these good things. (No, that's too much to hope for.)

In any development situation, what is sustainable ecologically, socially, culturally or economically can be objectively determined up to a point. But beyond that point, the questions of what is sustainable is subjective; a matter of cultural and personal values. Also, there may be several ways to combine the various criteria (ecological, social, cultural, economic) of sustainable development, the optimum way being the one that wins consensus support from the people concerned.

Thus, much of our efforts to achieve sustainable development should be devoted to assembling and analyzing the information needed to understand the issues; achieving a consensus among the communities concerned; and reaching agreement with the other interested parties.

At the project level, there is a small but growing body of experience about how to do this. Let me give you two examples:

Red Dog Mine, Alaska

Cominco's Red Dog Mine in northwest Alaska is an example of how a major nonrenewable resource development project can meet ecological, social and cultural criteria of sustainability by consulting and reaching a mutually satisfactory agreement with the local people.

The Red Dog zinc mine has been under construction since 1986, and is expected to start up in January 1990. By agreement between Cominco and NANA (the native regional corporation) a subsistence committee has been set up consisting of hunters from the communities of Kivalina, Noatak, and Kotzebue. The committee reviews and monitors the construction programme, and identifies operations (including transport and supply) that pose a risk to subsistence resources (chiefly caribou, bowhead whale, and beluga) - for example, by disturbing the animals during migration or the hunting season. The committee negotiates with the company on the timing of operations to ensure they do not disrupt either the animals or hunting; and can halt operations at particular sites during periods of extreme sensitivity, such as when whales are migrating close to shore. In addition, to minimize social damage yet maximize the opportunity for native people in the region to work at the mine, Cominco and NANA have agreed that there should be no town at the mine site; and that shifts should be two weeks on and two weeks off -- allowing local workers time in their communities, maintaining their subsistence lifestyles[1].

Golden Spike Sour Gas Project, Alberta

Hewitt Oil (Alberta) Ltd. produces sour gas in the Golden Spike area, southwest of Edmonton, Alberta. Sour gas is rich in hydrogen sulphide, which has to be removed before the gas is sold. For 17 years this had been done at Esso's Golden Spike plant, but in 1984 Esso decided to decommission the sour gas processing facility because of its age. Hewitt Oil had to build and operate its own plant; and realizing that this would meet strong public opposition, made sure that the plant would not produce any sulphur emissions or flare gas except in emergencies[2]. Thus, the plant would have resulted in a net drop in sulphur dioxide emissions. Even so, the proposal provoked an outcry from residents, who were concerned about the potential release of hydrogen sulphide, the effects of sour gas on health, use of groundwater by the plant, the impact of industrial development on property values, and the lack of a strategy for the orderly development of energy resources in the area.

A hearing of the Energy Resources Conservation Board (the provincial approval authority) effectively covered the technical and engineering aspects of the proposal, and satisfied many of the community's concerns about the health, safety and environmental issues. But it left unresolved its concerns about the impact on property values, and the lack of a plan to prevent proliferation of gas processing plants. These were satisfied by the Voluntary Energy Development Utilization Plan (VEDUP), an agreement negotiated by Hewitt Oil and the two community organizations, Parkland Rural Residents Association and Golden Spike Environmental Protection Society; and endorsed by the Energy Resources Conservation Board. VEDUP:

Recognized the community's desire to have no more gas processing plants in the area.

Expressed Hewitt Oil's willingness to serve as a central processor of natural gas within an agreed radius of the proposed sour gas processing plant.

Set out a procedure to avoid additional gas processing plants in the area[3].

In addition, Hewitt Oil and Parkland Rural Residents Association agreed upon an undertaking by Hewitt Oil to deal with the community's remaining environmental concerns[4].

Everybody has benefitted from these voluntary agreements. Hewitt Oil won the support of the two community organizations in its application for a development permit[5], and maintained good relations with the local residents. The community won the environmental safeguards it sought and a means of controlling future gas development. The provincial and municipal approval authorities avoided a protracted, divisive and expensive conflict[6,7].

Need for Sustainable Development Strategies

Encouraging as these imaginative examples are, their scope is necessarily limited. We need established procedures for resolving disputes over development decisions. It has been estimated that the cost to Hewitt Oil of getting the sour gas plant operating could have been reduced by a third if a formal mechanism had existed for getting the parties together[7]. Still more, we need mechanisms for avoiding disputes in the first place.

Rising demand, fixed or diminishing supply, and economic diversification -- all sharpen competition for natural resources. Land use conflicts are certain to increase, unless effective multisectoral ways are found to integrate environmental conservation and resource development. There is a simple reason for this: sectors as diverse as forestry, fisheries, agriculture, tourism, wildlife, mining, and water supply, share common multisectoral ecosystems. But resource allocation and management in Canada -- as in other countries -- is basically sectoral and single purpose. Sectoral divisions obscure potential compatibilities among competing user groups, and increase the difficulty of resolving conflicts.

Recognizing this crucial problem, the National Task Force on Environment and Economy stated that the "principles of shared responsibility and integrated decision-making must become the foundation of our institutions and guide our key decision-makers"[8]. This sharing and integration must be both horizontal (among different sectors) and vertical (among the different levels of government and society).

This calls for something more than holding hearings, or other forms of public input, and inviting local authorities and the public to comment on plans and programmes drafted by the provincial government or industry. Such passive participation often restricts people to making minor changes to proposals that do not reflect, and may be destructive of, the development goals of the communities and interest groups concerned.

Instead, local governments, businesses, communities and interest groups should play a greater part in setting the agendas for economic development. The most promising means for them to do this is through sustainable development strategies, whether at the provincial/territorial level, the regional/local level, or both.

A sustainable development strategy is a process to help a society define its sustainable development objectives, examine its policies and institutions with respect to these objectives, identify the priority actions to achieve the objectives, and implement the actions.

Some conflicts over the allocation and management of resources are avoidable, being due to inadequate organization, inflexibility, misperceptions, and lack of awareness. A sustainable development strategy can overcome these problems by devising ways of combining development and conservation and coordinating sectors wherever possible. Other resource conflicts are unavoidable and call for decisions on priorities. A strategy can facilitate such decisions, by building a consensus on criteria and mechanisms, including procedures for resolving disputes. This can seldom, if ever, be done by conventional political means, because the political process fosters adversarial positions.

Since the World Conservation Strategy was launched by five international agencies[9] in 1980, 54 national and subnational conservation strategies have been started in 41 countries (29 developing countries and 12 developed countries). In Canada, strategies are being developed in Alberta, Northwest Territories, Prince Edward Island, and the Yukon. Strictly speaking, many of these 54 strategies are not sustainable development strategies. Nonetheless, they provide the only body of practical experience on how to deal strategically with the three key issues of sustainable development: cross-sectoral coordination; integration of development and conservation; and participation by all interest groups in decision-making.

Many of the current generation of conservation strategies are still being prepared; but results from those in the implementation phase show they can achieve:

Policy changes (including a cross-sectoral policy on resource development and conservation).

New or amended legislation.

Changes in organization, such as new or improved institutions and processes, including procedures (agreed to by all interest groups) for dispute resolution.

Adoption of new or improved regulatory and assessment procedures.

Improved ways of achieving conservation and development.

Better information on resources and resource management issues.

Greater public understanding and support for measures needed to achieve sustainable development.

Victoria Conservation Strategy, Australia

For example, the State of Victoria, Australia, has prepared three closely related strategies: an economic strategy; a social justice strategy; and a conservation strategy. Together these amount to a sustainable development strategy. Among the directions set by the conservation strategy that are of particular interest to us in Canada are:

1. Development of regional strategy plans, to encourage community involvement in planning.

2. Assistance to local governments and other organizations to prepare local strategies and action plans.

3. Legislation on Crown land, separating it into two categories: public land, with protection and conservation as principle objectives; and government land, incorporating the developed part of the crown estate.

4. A corporate, cross-sectoral approach to governmental management of resources and the environment, exemplified by the gradual adoption of a coordinated, cross-sectoral budget for conservation.

5. Support for research on the economic potential of native species for industrial, pharmaceutical and agricultural uses; and on the genetic variability of these species.

6. A timber industry strategy that provides for (a) all forest values and uses, including water quality, landscape, protection of flora and fauna, recreation, and timber production; (b) long term planning to ensure regeneration of logged forests; (c) preservation of the genetic diversity of timber-producing species through conservation of populations in reserves, and through regeneration of logged areas using seed of the logged populations[10]; (d) increasing value added from timber production; (e) new technology to make the timber industry more competitive; (f) support for communities where changes in the timber industry, including changes in forest use, are likely to cause social and economic difficulties; (g) public participation in the planning process. Forest operations must be sustainable not only in terms of timber production but also in terms of other forest values such as water production and conservation of biological diversity[11].

Characteristics of a Successful Strategy

The five characteristics of a successful strategy are:

1. Preparation and implementation by a partnership of government and the public. A national or provincial/territorial strategy should be a government policy statement, not a public advisory statement. Hence, the cabinet should be committed to its implementation and the government should lead its preparation. However, the strategy should result in commitments to action by business, interest groups and other nongovernmental agencies, as well as by government; and it should be prepared jointly by government and the public (rather than by government in-house and then submitted to the public for comment.)

2. Well planned and adequately funded organization. This should include a small full-time secretariat to undertake day-to-day management of the strategy's preparation; and a high level steering committee (representative of the main governmental and nongovernmental interests) responsible for overall direction of the strategy, keeping cabinet informed of emerging policy issues, and ensuring the full participation of all sectors and interest groups.

3. A strategy document (or documents), providing:

    a. An evaluation of the socioeconomic contributions of the area's natural resources and environment, showing the overall and relative importance of the various renewable and nonrenewable resource sectors, and the environments and natural resources required to maintain each sector. This is needed so that all participants can see clearly how and to what extent each sector and interest group benefits from the region's environment and resources[12].

    b. An assessment of the main resource management issues in the area, showing the measures required to develop and conserve the region's resources and environment for all interest groups -- including opportunities and needs for combining development and conservation[13].

    c. A cross-sectoral policy on development and conservation of the area's natural resources and environment, proposing government policies for allocating resources, coordinating sectors, resolving conflicts, and combining development and conservation.

    d. An action plan, setting out how governmental and nongovernmental agencies will translate the strategy and policy into results. This should identify the strategic directions and priority actions that should be taken by government agencies, business, nongovernmental organizations, and local communities[14].

4. A consultation programme to ensure that the strategy builds and reflects a consensus of all interests on: (a) the objectives of sustainable development; (b) the desired development and conservation products of the strategy; and (c) what needs to be done to achieve them. It should also ensure the

best chance of all participants implementing the strategy by enabling them to contribute substantively to it and by giving them a stake in the strategy's implementation.

5. Demonstration projects to show the meaning and feasibility of sustainable development in practical terms. Most people have great difficulty grasping unfamiliar abstractions like sustainable development. Model sustainable development projects are needed to provide tangible "real life" demonstrations, particularly of ways of reducing conflicts and enhancing compatibilities among resource uses. An example might be a project that combined sustainable timber production and wilderness tourism, to show how the two potentially conflicting resource uses could be made compatible, and how logging communities could diversify their economies.

This next generation of strategies should be true sustainable development strategies. Most conservation strategies have concentrated on allocation and management of land uses, resource maintenance, and conservation -- leaving promotion of development to economic development policies. The likely consequence of this separation is that both the conservation strategy and the economic development policies will be unrealistic. The conservation strategy will be divorced from efforts to develop and diversify the economy. The development policies will be divorced from efforts to maintain the resource base and protect the environment. True integration of environment and economy is likely to be a matter of achieving development and conservation together as one process. To achieve such integration, a sustainable development strategy should be a combination of an economic development plan and a conservation strategy.

Regional and Local Sustainable Development Strategies

Sustainable development strategies should be undertaken in Canada at the federal and provincial/territorial levels. In addition, regions and communities should be given the opportunity to prepare their own sustainable development strategies. Once approved by the responsible (provincial or territorial) government, each such strategy should be the principal land use plan for the area concerned. Strategies need not be prepared by every locality; only by those that wanted to. They could be undertaken as part of a provincial/territorial strategy, or independently[15].
Regional and local strategies would have four functions:

1. Assemble and analyze accurate data on the economy of the region (including data on the nature and monetary value of the various economic sectors) and on the he ecological resource base of each economic sector.

2. Provide a forum and process through which the region can achieve a consensus on the sustainable development of the area, including the goals of future development and the preferred nature, size and structure of the future economy of the area.

3. Provide a means by which the region can agree on: (a) measures to ensure that each sector's ecological resource base is secure; (b) measures to promote each sector's appropriate development;

4. Provide a mechanism for developing a constructive dialogue and reaching agreement with other affected localities and interests on the sustainable development of the region.

Sustainable Development of Clayoquot Sound, British Columbia

Resource issues in Clayoquot Sound, British Columbia, illustrate the need for regional and local sustainable development strategies in Canada.

Clayoquot Sound is a distinct environmental and economic subregion on the west coast of Vancouver Island. It is exceptionally beautiful, and rich in wild resources. Clayoquot Sound is also unique, due to a combination of three factors: (1) it is the only section of the outer coast of Vancouver Island left with large tracts of wilderness; (2) it is the most accessible open ocean wilderness in western Canada; and (3) based on these attributes, it has developed a booming tourist industry with great additional potential. The economy of Clayoquot Sound has always been based on its natural resources. Traditionally, the mainstays have been fishing and logging -- which are still significant. But today, the rapid growth industries are tourism and mariculture, employing more than 50% of the community's workforce[16].

Despite the diversification of Clayoquot Sound's economy, and the emergence of tourism as the principal employer and growth sector, land use and resource management outside municipal boundaries continue to be sectoral in scope, based primarily on timber production. Current logging practices are incompatible with the new environmentally sensitive growth industries. Indeed, there is debate about the sustainability in terms of timber production. The people of Tofino and the native communities feel strongly that the forests are not being managed in their best long-term interests. Local economic growth, job creation and community security are threatened by inadequate, single-sectoral management of the region's resource base. For their part, the timber companies face the prospect of increasing levels of confrontation and disruption of work if conflicts with the community cannot be resolved in a cooperative manner.

Clearly, new resource management procedures are needed. In fact, this need is felt throughout B.C. Recognizing this, the B.C. Government's policy on regionalization calls for "new mechanisms... to resolve ... [land use] conflicts in a manner that reflects regional needs and aspirations and ensures environmentally sound and sustainable economic growth"[17].

The District of Tofino and the Tofino-Long Beach Chamber of Commerce have responded to this call by forming a sustainable development steering committee and proposing a community-based Sustainable Development Strategy for Clayoquot Sound. The objective of the strategy is "to strike an environmentally sensitive and sustainable balance among the community's resource base". Its functions are to provide a forum and process through which the communities of Clayoquot Sound can achieve a consensus on the area's sustainable development; and to provide a mechanism for developing a constructive dialogue and reaching agreement with the other interested parties (provincial government, industry, and neighbouring communities)[18].

achieve a consensus on the area's sustainable development; and to provide a mechanism for developing a constructive dialogue and reaching agreement with the other interested parties (provincial government, industry, and neighbouring communities)[18].

In many other regions and localities in Canada, there is a similar need for cross-sectoral management of resources and environment, that reflects local residents' concerns and values, and takes account of all sectors and interests in the area. Given the opportunity, I am sure that, like the people of Clayoquot Sound, many will choose the sustainable development strategy as a means to meet this need.

Notes

1. Source: Peter Scheffer, Vice President, NANA Regional Corporation, personal communication, May 1989.

2. A catalyst converts the hydrogen sulphide to elemental sulphur, water and carbon dioxide. The sulphur slurry is stored on site temporarily, and then removed by truck.

3. Future proposals to process natural gas would first have to consider sending the gas to the Hewitt Oil plant. If it became necessary for Hewitt Oil to expand its plant to accommodate other producers' gas, Hewitt Oil could expect the support of the community organizations. Hewitt Oil could refuse to process gas, if certain criteria were not met with respect to the financial stability of the producer, return on investment, and compatibility of the gas with the plant's processes and capacity.

4. These concerns included: baseline air and soils quality monitoring, provision of monitoring data to community groups, an emergency response plan, chemical containment, plant operations, plant security, landscaping, signage, use of access roads, trucking of water supplies, and tenders from local contractors.

5. Granted in 1986 by the Municipal Planning Council of Parkland County.

6. Another benefit of the process was the formation of the East Parkland Liaison Committee (consisting of representatives of resource industries operating in the area, the two community organizations, and provincial and municipal governments), to provide a forum for all parties to continue exchanging information and working together. The Committee's formation was supported by the Energy Resources Conservation Board on the recommendation of the Sage Institute (Edmonton), which had been asked by the Board to examine industry and public concerns and perceptions.

7. Source: Lilley, J. 1987. "Alternative conflict resolution and the Alberta Conservation Strategy". Environmental Council of Alberta, Edmonton.

8. National Task Force on Environment and Economy. 1988. Report of the National Task Force on Environment and Economy. Canadian Council of Resource and Environment Ministers. Downsview, ON.

9. World Conservation Union (IUCN), United Nations Environment Programme (UNEP), World Wide Fund for Nature (WWF), Food and Agriculture Organization of the United Nations (FAO), and United Nations Educational, Scientific and Cultural Organization (Unesco).

10. Although our timber industry is ten times the size of Australia's, and although the tree improvements obtainable from use of genetic diversity are vital to the economic future of the industry, we do not have such a policy in Canada.

11. Source: Victoria (Australia), Government of. 1987. Protecting the environment. A conservation strategy for Victoria. Government Printer, Melbourne.

12. The evaluation would provide essential information for the identification of common interests and compatibilities among the various sectors and interest groups. Thus, it is an important first step in enhancing and taking advantage of such compatibilities, reducing conflicts, and formulating policies to accommodate incompatible uses.

13. The assessment should include: (i) a review and analysis of the potential and needs for development of the area's natural resources; (ii) a review and analysis of the status, trends and needs for conservation of the area's natural resources and environment; (iii) an analysis of interactions among sectors and interest groups (identifying common interests and compatibilities among sectors), and of the opportunities and requirements for combining development and conservation; and (iv) an analysis of the scope, provisions and implementation of legislation and of the mandates and operations of governmental and nongovernmental agencies, concerning the effectiveness with which they meet the identified needs for development, conservation, and integration of development and conservation.

14. Strategic directions describe broadly what should be done to implement the cross-sectoral policy and to meet the needs identified in the assessment of the main resource management issues. Priority actions are the measures that should be taken in the next 2-5 years (especially actions on which other measures depend).

15. A possible funding formula would make the region concerned responsible for raising 50% of the cost of preparing its sustainable development strategy, with the senior governments providing a matching grant to cover the other 50%.

16. The Steering Committee for Sustainable Development (District of Tofino & Tofino-Long Beach Chamber of Commerce). 1989. "Responding to the challenge. Community based sustainable development". Tofino, BC.

17. Province of British Columbia. 1988. Regionalization. Framework for Action. Queen's Printer for British Columbia.

18. Source: Steering Committee of the Chamber of the District Council of Tofino and the Tofino-Long Beach Chamber of Commerce. 1989. Sustainable development strategy for Clayoquot Sound. A project proposal. Tofino, BC.

SUSTAINABLE DEVELOPMENT AT THE COMMUNITY LEVEL

Sylvia Sutherland

Mayor of Peterborough
500 George Street North
Peterborough,.Ontario. K9H 3R9

Much of the debate concerning the relationship between environmental policy and economic development, in other words, sustainable development, has concentrated upon the macro-economic and national and international policy issues. My aim is to focus attention more directly on the micro scale and to consider the relationship between development and environmental programs or policies at not only the regional but the local level. Unless there is an understanding of these issues at this most basic level of government, the achievement of the goals we are all seeking on the larger scale will be at best, hindered and at worst, lost.

It is not enough to recognize that the Brundtland report holds out hope, as indeed it does, for that hope will not easily be realized. The realization of that hope will require action, commitment and self-sacrifice not on the part of some other individual, not on the part of some other agency, not on the part of some other government, but on the part of each one of us. Speaking to the Government Commission in September of 1986, Joseph Ouma, Dean of the School of Environmental Studies at Moi University in Nairobi, said "The environment is the business of everybody, development is the business of everybody, life and living is the business of everybody. I think the solution will be found in encouraging mass environmental literacy so that there can be democratic and literate decisions, because if decisions are taken by a few without the incorporation of the opinion of the masses, the likelihood is that solutions will not succeed. They will be imposed from above. The people will not respond positively to them, and the project is lost before it is launched."

There are issues, of course, which are beyond the local level. In a recent issue of The Spectator, Charles Clover, the environmental correspondent for The Daily Telegraph, outlined a hierarchy of sustainable development issues. First were economic security issues, that is things such as greenhouse gases, population growth, desertification, deforestation, and pollution resulting from accidents such as those in Chernobyl and Bhopal. Next on his list were quantitative issues, such as what levels do we establish for industrial emissions, nitrates in water, and lead in pesticides. Next, what he called the Nimby issues. In this he included the channel tunnel, what part of the south of England should be built upon, and what should be held in greenbelt. And finally, there were the largely aesthetic questions, such as litter. There is very little a municipal government can do about the first two items in Mr. Clover's hierarchy; we can, however, make very real decisions related to the last two.

It was this realization that contributions to the theory and practice of sustainable development can and must begin at the local level that led to the establishment, last October, of the Peterborough Committee on Sustainable Development. In part, it was a response to a challenge by Michael Bloomfield, the Executive Director of the Harmony Foundation of Canada, that Peterborough could become "a model of sustainable development". I really do not know whether we can accomplish that or not, but we can certainly try.

Peterborough, Ontario is a community of roughly 63,000 people, about 85 miles north and east of Toronto. It sits in the middle of some of the most beautiful lake districts in Ontario, and perhaps, the country. Economically, it has a traditional manufacturing base, including such industries as General Electric Canada, Outboard Marine Corporation and Quaker Oats of Canada. That traditional base has become more diversified in recent years, with the attraction of such companies as Ethicon Sutures and Kendall of Canada. The community has experienced stable but slow growth for more than a decade now, although the last three years has seen an acceleration of this growth, a situation that is expected to continue as pressure mounts from the "Golden Horseshoe" to the east of Toronto, and as a four-lane highway route linking the city with the 401 nears completion. In other words, the City is going to have to make some hard decisions very soon, indeed is in the process of making those decisions now, regarding the nature of its future development. With a growing awareness of the relationship between development and the environment, a growing understanding that economic growth must be sustainable, and a growing sense of the necessity for generational equity, it is my prediction that the decisions we now make regarding the future of the City and the surrounding area will be substantially different than similar decisions might have been 10, 15 or 20 years ago.

The Peterborough Committee on Sustainable Development was formed early in October of last year as a local response to the challenge laid down by the World Commission on Environment and Development and Canada's Task Force on Environment and the Economy. I asked Professor Bob Paehlke of the Political Studies Department of Trent University to chair the committee which comprises representatives from business and industry, including the President of Quaker Oats of Canada, the Vice-President of General Electric Canada, and two representatives chosen by the Canadian Manufacturers Association; representatives from the Business Improvement Area; and the local Chamber of Commerce. The committee also includes representatives from the Otonabee Region Conservation Authority; the Ministry of Health; the Ministry of the Environment; Parks Canada; the Ministerial Association; Trent University; Sir Sandford Fleming College; the Directors of Utility Services, which includes Engineering and Planning and Development for the City of Peterborough; and representatives from City Council. To the best of my knowledge, no other community in the Province of Ontario has established a committee with quite the same mandate. It is my hope that our committee will move beyond duplication of the many existing efforts of pollution control and ecological preservation. It is my hope that it will resist the temptation that has affected so many other environmental movements to draw on itself in a sea of rhetoric. It is my hope that it will take initiatives and develop programs that will provide a model for other communities.

The Peterborough Committee on Sustainable Development has divided itself into several sub-committees: Business and Industry, Projects, Review, and Planning and Policy. To date, we have had five meetings of the entire committee and almost an equal number of each of the sub-committees.

I think that, even at this early stage, we are beginning to see some very real results from our activities. For example, the Business and Industry Sub-committee obtained copies of the "Environmental Guidelines for World Industry", produced by the International Chamber of Commerce in 1986. These guidelines were the result of the World Industry Conference on Environmental Management held in Paris in November of 1984. They call for a high standard of commitment to environmental requirements on the part of industry, but also make it clear that a constructive contribution from industry depends to a large extent upon appropriate regulations and governmental policies, indeed upon a parallel contribution from all sectors of the community. The guidelines were framed in a way that makes them applicable to industry in developing countries as well as to industry in the most industrialized areas of the world, to both private and state-owned enterprises, and to multi-national as well as national enterprises. "Industry" to which the guidelines are addressed is by no means the manufacturing industry alone. The guidelines are equally applicable to the operations, for example, of the transport industry, the tourist industry, public utilities and agriculture.

These guidelines were initially distributed to participants attending a seminar last fall on the introduction of tipping fees at the local landfill sponsored by the City. They were later reviewed by the Industry and Business Sub-committee, and the general principles reduced to a one-page format which could be displayed in any local industry or business. The Industry and Business Sub-committee will shortly be following up with local industry to determine the acceptability of these principles and to attempt to extract from local industry a commitment to attempt to live up to these guidelines. It is our understanding from representatives from local industry who sit on the sub-committee that such a commitment should probably be obtainable. If nothing else, such discussions will increase awareness of the issues at hand. I do believe, however, that the results may very well reach beyond awareness.

The next project the Business and Industry Sub-committee will be taking on is the establishment, with the cooperation of the City of Peterborough and local business and industry, a local materials exchange program. The City of Peterborough has recently hired a full-time Solid Waste Reduction Officer, who will play a key role in the coordination of such a program. We will be attempting to coordinate our efforts with the Ontario Waste Exchange Program. The basic premise behind such programs is, of course, the idea that what is one man's junk can be another's treasure -- something every woman who has ever attended a garage sale immediately recognizes.

The Projects Sub-committee has already established a series of awards to be given to representatives of local business and industry as well as individuals who have contributed in a positive fashion to the principles of sustainable development. To date, one such award has been given out to a local teacher who established the Blue Box Recycling in our elementary schools. The second award will shortly be given out to representatives of the Outboard Marine Corporation of Canada for their efforts in recycling and reusing materials that formerly were sent to the local landfill. The Sub-committee is also hoping to encourage a massive local tree-planting effort in Peterborough later this spring.

Both the Review and the Planning and Policy Sub-committees are examining a recent report from the Greater Peterborough Economic Council, which takes a look at the growth and development of the

City of Peterborough into the next century and suggests a unicity concept similar to the one that is found in the City of Winnipeg. These committees will be reviewing that document with the issues and concepts of sustainable development very much in mind. In addition, the Planning and Policy Sub-committee recently heard a proposal put forward by representatives of Trent University and Sir Sandford Fleming College to establish a pilot study to develop a sustainable development plan for the Peterborough/Lakefield Corridor. The Sub-committee is encouraging these two institutions to cooperate together in such a study, and I will, in my role as a representative on the Provincial Round Table, encourage the Round Table to consider this as a possible demonstration project for the province.

Efforts to encourage the principle of sustainable development, to be constantly aware of the necessity to integrate the economy with the environment, have extended locally in Peterborough beyond the Committee on Sustainable Development. For example, each department at City Hall will very shortly be required to include among all other considerations in recommending future projects an assessment of the environmental impact of such projects. Planning, Development and Engineering, particularly, are being asked to take into account sustainable development and environmental factors at the earliest possible opportunity. As I mentioned earlier, we have initiated a $50-per-tonne tipping fee at the local landfill site, we also introduced a highly successful Blue Box Program, and will in the course of the next year, be establishing an experimental composting facility in an attempt to divert 40 per cent of waste from the local landfill by the year 1992.

The municipal agenda has several major items coming forward in the next few years where the consideration of the integration and economic factors will play a major role. These include a Transportation Plan Review, a Water Quality Report, a Solid Waste Management Master Plan Study, a Parks Study, a Downtown Action Plan Review, and an Official Policy Review.

When we talk about the principle of sustainability at a local level, I think it is useful to look at this from three points of view: productive sustainability, which refers to the use of natural resources such as soil or water so that their long-term productivity is not impaired; social-economic sustainability, referring to the establishment of an economically viable community; and aesthetic sustainability, referring to the maintenance of the community's natural and cultural heritage. All these play a crucial role in providing development that "meets the needs of the present without compromising the ability of future generations to meet their own needs."

In considering all of them, there is a problem of uncertainty. What is the best thing to do when you do not know and cannot know the full consequences of your actions, so the possibility of uncertain benefits must be weighed against the possibility of uncertain costs? In consideration of all of them, there is a call for a distinction between wants and needs and a re-examination of the relationship between consumption and satisfaction. These challenges must be recognized and met at the local and the regional levels before they can be adequately dealt with at any further level.

If sustainable development is to work at all, there will have to be a fundamental change in direction for us individually and collectively. An anonymous speaker from the floor at the Brundtland Commission

Hearings in Djakarta said it far better than I am able when that speaker stated, "We in Asia, I feel, want to have an equilibrium between the spiritual and material life. I notice that you (meaning the West) have tried to separate religion from the technological side of life. Is that not exactly the mistake in the West in developing technology without ethics, without religion? If that is the case, and we have a chance to develop a new direction, should we not advise the group on technology to pursue a different kind of technology that has a space not only in rationality, but also in the spiritual aspect? Is this a dream, or is this something we cannot avoid?"

Recognizing the enormity of the challenge before us, we can, it seems to me, do one of two things -- we can panic and perish, or we can, each one of us, take action based on hope and survive.

ACHIEVING SUSTAINABLE REGIONAL ECONOMIC DEVELOPMENT

Michael Dector

Peat Marwick Consulting Group
1200-477 Portage Avenue
Winnipeg, Manitoba R3B 3H5

ABSTRACT

The task of achieving sustainable regional economic development calls for a careful and creative balancing of economic development, job creation, job maintenance and environmental considerations. To date, the machinery of government in Canada at both the Federal and Provincial level is not well designed for this purpose. Departments of regional development or economic development have been largely oriented to grants or contributions to support individual corporations or through Federal Provincial Agreements to support sectoral development.

If we are to achieve sustainable regional economic development we will need to find a technique and methodology for combining the analytical functions present in both the environment and regional economic development departments with the funding authority which is currently present only in departments of developments. Essential to this process will be agreement on the willingness of the public sector to expend funds to achieve its result. As well, agreement on the obligations on the private sector will be necessary. What will also be required is the ability to create partnership. These partnerships are needed not only at the level of environmental or sustainable development round tables but at the level of individual corporations and governments and communities.

What will be essential to success in this area is appropriate machinery of government, shared objectives among stakeholders and leadership. The current machinery and approach will not achieve sustainable regional economic development and will lead to significant conflicts among governments, corporations, environmental activists and other stakeholders.

WESTERN ECONOMIC DIVERSIFICATION AND SUSTAINABLE DEVELOPMENT

Dennis Wallace

Assistant Deputy Minister
Department of Western Economic Diversification
712-240 Graham Avenue
Winnipeg, Manitoba. R3C 0J7

Since April 1988, I have been the Assistant Deputy Minister for the Federal Department of Western Economic Diversification, responsible for the operations of the Department in Manitoba. I would like to preface my remarks today with a few brief words about this much talked-about department which the Government of Canada launched in August 1987.

Quite simply, my Department is dedicated to changing the structure of the western Canadian economy. Working with the private sector, other departments and provincial governments, we are encouraging diversification -- new growth in new directions -- to free the west from its narrow economic base of primary resource-production.

The challenge of diversification, while not unique to western Canada, is perhaps more deeply felt in western Canada than in other parts of the country. The ready availability of natural resources has been both the west's greatest strength and its greatest weakness.

The dependence on the resource sector has left western Canada vulnerable to the boom-and-bust cycles of international commodity markets.

The goal of our Department is to help moderate the swings inherent in resource markets by stimulating the development of complementary economic activities.

We have been given the tools to do the job -- a $1.2 billion dollar fund to support projects involving the development of new products, new markets, new technologies, productivity gains and import replacements -- a mandate to influence federal purchasing (procurement) decisions in favour of western Canadian industry -- and an ability to advocate western Canadian interests in federal Cabinet decisions.

Although relatively new, we are now making a difference in the west, having committed some $496 million for over 900 projects, involving roughly $1.8 billion of investment and 15,000 jobs. On the procurement side, we were instrumental in several projects including the designation of Canadian Foremost of Calgary as the prime contractor on the DND Northern Terrain Vehicles Contract and the commitment, in announcing the $1.3 billion tactical command control and communications system purchase, that a substantial portion of the benefits would flow to western Canada.

We are a western-based Department with headquarters in Edmonton and regional offices in Vancouver, Edmonton, Saskatoon and Winnipeg. Material is available about Western Diversification. I would invite you to pick it up, read it and speak to me personally about questions or ideas you might have regarding this important initiative.

Let me turn now to the question of "sustainable regional economic development". And I would like to begin by telling you what I am not going to discuss -- I am not an environmental economist or scientist, so I will not be talking about warming trends, environmental degradation, global policies and practices affecting the environment.

I am not a philosopher, so I will not engage in an abstract discussion about concepts, or try to define sustainable development. Finally, I am not an economic historian, so I cannot take you through the numerous iterations of federal policy aimed at reducing regional disparities in Canada. Fortunately, this Conference is well attended by experts in each of these important areas, so this ground will be well covered.

I am speaking to you as a practitioner involved in current efforts to diversify the economy of western Canada. As such, I wish to make three points:

First, federal industrial development efforts today are highly sensitive to environmental impacts;

Second, that growing public awareness to preserve and enhance the environment is leading to new market opportunities for environmentally-related goods and services;

And third, that the Department of Western Diversification is well poised to assist business and industry to take advantage of these growing opportunities.

As I mentioned earlier, one of my Department's key tools in promoting economic development in the west is the Western Diversification Program. The program is based and managed in western Canada, the guidelines for funding are flexible and the application process is straightforward.

Projects in the manufacturing and service sectors and from resource-related industries are eligible for assistance under the program. Non-profit organizations are also considered if they present a viable commercial project.

While Western Diversification's principal task is to promote economic diversification, we have also taken measures to ensure that the activities we support are both economically as well as environmentally sound. As part of the assessment process, each project is screened for environmental implications. In conjunction with Environment Canada, projects are reviewed to ensure that new activities meet federal, provincial and municipal environmental standards.

In some cases, we stipulate in our letter of offer of Western Diversification assistance that Environment Canada certification be provided before Western Diversification funds are disbursed. This process ensures that Western Diversification's economic development activities are environmentally sustainable. We will not finance projects that will have adverse effects on the environment. As well as reviewing all projects for their effect on the environment, the Department of Western Economic Diversification has also supported several major initiatives as well as many smaller projects that promote diversification while having a positive environmental impact.

In preparing for this talk I was struck, in fact, by the degree to which these objectives complement one another. For example, Western Diversification is contributing to the effort to remedy the serious problem of soil degradation in western Canada by providing $45 million of the $75 million federal commitment to soil conservation. In partnership with farmers and provincial governments, the initiative will provide for on-farm technical and financial assistance for soil conservation practices and demonstrations, research, monitoring and public awareness.

Western Diversification has also set aside $25 million, to be matched by the provinces, for the development of agricultural biotechnology in western Canada. Advances that can be made in reducing the use of fertilizers, herbicides and pesticides in western Canada's large agricultural sector through biological improvements can lead to substantial environmental benefits.

Western Diversification has also supported activities that assist the preservation of nature. These include the establishment of a national park and a national marine park in the South Moresby Area of the Queen Charlotte Islands.

Along with the Departments of Agriculture and Environment, Western Diversification provided funding for waterfowl conservation under the North American Waterfowl Management Plan.

We have also provided assistance for the development of Wanuskewin Heritage Park, a unique Plains Indian heritage and archaeological resource in the South Saskatchewan River Valley. Our goal here is to develop a major tourism generator that preserves the delicate environment while developing archaeological digs.

As many of you know, here in Manitoba we are a partner in the Forks Redevelopment. Careful attention has been paid to the historical and archaeological remains in developing the site.

We are all aware of the effects of so-called coal-burning smoke stack industries and their impact on acid rain gas emissions into the atmosphere. Fortunately, western Canada has an abundance of low-polluting low-sulphur coal.

Working with industry and the provinces of British Columbia, Alberta, Saskatchewan and Ontario, Western Diversification is supporting activities that will enhance the competitiveness of western Canadian low-sulphur coal in the Ontario market.

The initiative will provide for expanded markets for coal from western Canada as well as making significant progress in reducing acid gas emissions in Ontario.

These major, industry-wide projects are important in our objective of achieving sustainable regional economic development and I expect we will be seeing more of them in the coming months and years.

On a related front, Western Diversification is also assisting many private sector projects, both large and small, that are developing new products, processes and services that will assist in our efforts to maintain a clean and safe environment. Across the west, we are seeing more companies taking part in this new growth industry and we as a department, are supporting their efforts. Examples of the types of projects we have supported include:

- helping a company develop a low-cost, easily transportable rotary incinerator for disposing oily wastes;
- In response to environmental concerns about traditional methods of removing gold from some ores, a company has developed a process which involves chemical oxidation of the minerals in which gold in locked. Once these minerals have been destroyed, the gold can be extracted without adverse environmental affects;
- we are helping a company build a prototype photochemical scrubber to control noxious industrial odours which can be used in animal rendering plants, meat packing and fish meal processing plants, as well as sewage treatment plants;
- a company in Alberta is developing and field testing a prototype pipeline locator and fault detector -- once in production, the equipment will allow the oil and gas industry to quickly detect and more accurately identify pipeline faults that are likely to rupture and endanger the environment;
- in Saskatchewan, we are assisting a Canola crushing and oil refining plant develop new saleable products out of previously discarded Canola crushing by-products;
- Western Diversification is also contributing toward the cost of a major international environmental conference in Vancouver in 1990 which will address environmental issues and solutions with particular emphasis placed on the Asia Pacific region;
- here in Manitoba, we have helped support the establishment of a hydroponically grown lettuce facility which uses a technology called nutrient fluid technique. The more efficient use of energy and elimination of pesticides contributes to sustainable development;
- Woodstone Foods in Portage la Prairie has received Western Diversification assistance to expand its production of dietary fibre products. Using technology the company developed itself, Woodstone has found a way to produce a fibre product from yellow peas. Some of the raw materials in this process were previously discarded as by-products.

Clearly, the demand for new goods and services aimed at preserving and enhancing the environment presents major opportunities for business expansion.

These are just a few examples of Western Diversification's efforts to work with business to exploit these opportunities. The last point I want to leave you with is this: my office is seeking ideas, projects, proposals and investments in western Canada. We have the funding, the people and the flexibility to work with you on proposed new activities that support our diversification objective, especially with new products, new technologies and new markets for western Canada. Please talk to us, even if you are at the concept stage. You will find us very receptive to new ideas.

Thank you for your attention and I welcome any questions you may have.

TITLE: Luncheon Speaker
SESSION: Thursday, Noon
BULLETIN NO.: 12

MARC GARNEAU, Canadian Astronaut and Deputy Program Manager for the Canadian Astronaut Program said the Brundtland Report signals the fundamental change the age of space exploration has made in humanity's understanding of itself and our planet.

Garneau quoted the opening of the report: "From space, we see a small and fragile ball dominated not by human activity and edifice but by a pattern of clouds, oceans, greenery and soils. Humanity's inability to fit its doings into that pattern is changing planetary systems fundamentally. Many changes are accompanied by life-threatening hazards. This new reality, from which there is no escape, must be recognized--and managed."

During his week in space in 1984, Garneau said he was drawn to the orbiter windows and was struck by "a powerful awareness of just how tiny, fragile, finite and vulnerable this planet really is. Earth, I realized, is a delicate life-support system that humanity can so easily destroy."

He said photographs taken during space missions provide a new physical perspective and new understanding so that more and more people share concerns about the planet's total environment.

"Humanity's new space-age awareness of the Earth is a hopeful sign," he said. "It is, I believe, the first step on the road to effective action in protecting this planet and in keeping it habitable for ourselves and our descendants."

Garneau emphasized that space technology has extremely important concrete contributions to make to sustainable development. "If humanity is going to respond effectively to environmental dangers, better data on the Earth's natural systems is essential."

He said space can play a vital role in ensuring the continued habitability of the Earth through technology to monitor vital signs of the planet and aid humans in protecting its health.

Today, several dozen satellites contribute to the accumulation of new knowledge about the Earth's systems, he said. Garneau pointed out that satellites played a key role in the discovery of the "hole" in the ozone layer over Antarctica in 1986 and that remote sensing satellites perform many functions and have many applications in environmental monitoring and quality control. "They can take an inventory of mineral and vegetable natural resources, monitor crop growth and harvest-readiness, track changes in the Earth's ice cover, predict flooding, and even detect large schools of fish."

Photographs taken during space missions are another valuable source of information, he said. "Photographs from all the manned missions provide an excellent record over almost 30 years of one of the Earth's major environmental problems--tropical deforestation and desertification."

He said that NASA scientists have recently developed sophisticated models to analyze evidence of tropical environmental degradation from the photographs. From these models, they have developed an almost universal sequence in the cycle. It begins with forest conversion for agriculture, grazing and fuelwood. The deforestation is followed by soil erosion, exhaustion and compaction by hydrologic changes, and finally by desertification and abandonment.

Garneau said he believes Canada is well-positioned to take a leadership role in the collection of data relevant to the protection of the Earth's environment.

"Canada is an acknowledged world leader in the collection and processing of remote-sensing data and has developed a thriving remote-sensing industry.

Canada's Radarsat, planned for launch in the mid-1990's, is superior to any other synthetic aperture radar presently developed. "Radarsat's unique sensitivity to moisture in the ground and in vegetation will open a new window on monitoring agricultural and forestry conditions," Garneau said. "In addition, it will provide data on non-renewable resources, on hydrology and sea-ice, and weather information based on ocean surface temperatures.

Garneau presented a series of slides taken of the Earth during manned space missions which illustrated this process. He said, scientists believe the process from deforestation to desertification is reversible, however the photographs clearly showed that the degradation of the tropical environment is progressing unchecked around the world.

A PLANETARY PERSPECTIVE ON SUSTAINABLE DEVELOPMENT

Dr. Marc Garneau

Deputy Program Manager, Canadian Astronaut Program
Building M-60 Montreal Road
Ottawa, Ontario K1A 5J6

It is indeed a pleasure to be given this opportunity to speak on behalf of the Canadian astronaut program.

I would first like to congratulate the organizers on this excellent program and the many contributors participating in this Conference.

Environmental problems are global in scale. And effective action will require international cooperation and involvement at the very highest levels of business and government.

The Conference organizers have, I think, done an admirable job in bringing together senior representatives from business, government, and the environmental movement both from Canada and abroad.

I wish you every success in your deliberations this week. I hope that the dialogue begun here will lead to effective measures both in Canada and internationally.

Like many Canadians, I am deeply concerned about the environment, but my concerns are those of a non-specialist. However, as an astronaut and a member of Canada's space program, I feel I do have something valuable to contribute.

The World Commission on Environment and Development -- the Brundtland Commission - is largely responsible for making the term "sustainable development" part of our vocabulary and, more importantly, for making sustainable development a topic of concern around the world.

The now familiar first paragraph of the Brundtland report sums up in a powerful way what I think is the principal contribution of the space program -- a profoundly altered perception of our planet.

As you no doubt recall, the Brundtland report begins with this paragraph:

> In the middle of the 20th Century, we saw our planet from space for the first time. Historians may eventually find that this vision had a greater impact on thought than did the Copernican Revolution of the 16th Century, which upset the human self-image by revealing that the earth is not the centre of the universe. From space, we see a small and fragile ball dominated not by human activity and edifice, but by a pattern of clouds,

> oceans, greenery and soils. Humanity's inability to fit its doings into that pattern is changing planetary systems, fundamentally. Many such changes are accompanied by life-threatening hazards. This new reality, from which there is no escape, must be recognized -- and managed.

The Brundtland report signals the fundamental change the age of space exploration has made in humanity's understanding of itself and our planet.

But the report passes quickly over this new awareness -- an awareness I believe is critical for the ultimate success of the sustainable development movement. I would like to explain the new planetary perspective by describing how the experience of being in space changed my own perceptions.

During my week in space, I was busy with a series of experiments. But whenever I had spare time, I -- like the other six astronauts -- was drawn inexorably to the orbiter windows.

I have never gazed upon anything as spectacular as the view of this planet from the shuttle. Quite simply, it takes your breath away -- the soft green and brown pastels of the land, the craggy snow-capped mountain ranges, the crystal blue of the oceans, and the dazzling white of the overlying clouds. And down below, the signs of life are subtle, but unmistakable: sprawling cities, circular irrigation patterns, the wakes of ships, the condensation trails left by jetliners, bright city lights at night and burning oil fields.

Against the backdrop of infinite, cold dark space, earth is a small object of exquisite beauty and great complexity.

For the first time in my life, I was struck with a powerful awareness of just how tiny, fragile, finite and vulnerable this planet really is. Earth, I realized, is a delicate life-support system that humanity can so easily destroy. And, at least for the next few centuries, we have nowhere else to go. From space, it was immediately apparent that we are all citizens of the earth and this planet is our only home.

This heightened awareness of the earth as a unitary, fragile life-support system from the human race is something that only the fortunate few who go into space experience fully.

But as Brundtland points out, all of humanity has come to share this awareness, this new understanding, since the beginning of space exploration 30 years ago.

From the ground, a human being's horizon is limited to about 8 kilometers because of the curvature of the earth. But from the shuttle, you can see 1,600 kilometers in every direction. What's more, you are travelling at 24 times the speed of sound so you can circle the earth every 90 minutes. The Apollo astronauts were able to view the entire disk of the earth against the backdrop of space as they travelled to the moon or returned from it.

Although few have experienced the view from space firsthand, we have all seen photographs of it. As a consequence of this new physical perspective and the new understanding it brings, more and more people share concerns about the planet's total environment. People around the world are concerned about the build-up of greenhouse gases in the atmosphere, the depletion of stratospheric ozone, acid precipitation, tropical forest destruction, and threats to fragile polar environments.

Humanity's new space-age awareness of the earth is a hopeful sign. It is, I believe, the first step on the road to effective action in protecting this planet and in keeping it habitable for ourselves and our descendants.

I have underscored the fundamental importance of our new planetary awareness of the environment. But space technology has extremely important concrete contributions to make to sustainable development. If humanity is going to respond effectively to environmental dangers, better data on the earth's natural systems is essential. Space can play a vital role in ensuring the continued habitability of the earth through technology to monitor the vital signs of the planet and aid humans in protecting its health.

Today, several dozen satellites contribute to the accumulation of new knowledge about the earth's systems. For example, satellite observations played a key role in the discovery of the "hole" in the ozone layer over Antarctica in 1986. Satellite-generated maps have also served as a tool in understanding droughts and in targeting relief aid.

A valuable source of information is the photographs taken by astronauts during space missions. Astronauts have used hand-held cameras to photograph the earth since the mercury missions in the early 1960's. Since 1981, space shuttle astronauts have taken more than 37,000 photographs. About 85 percent of these photographs are earth-looking views and most are in natural colour.

Most shuttle missions are confined to orbiting the earth between 30 degrees north and 30 degrees south. This allows the crew to see all or part of 122 countries where 79% of the earth's population lives. Thus, the accumulated photographs from all the manned missions provide an excellent record over almost 30 years of one of the earth's major environmental problems -- tropical deforestation and desertification.

Recently NASA scientists have developed sophisticated computer models to analyze the evidence of tropical environmental degradation presented by the manned space flight photographs.

The scientists have documented an almost universal sequence in the cycle. It begins with forest conversion for agriculture, grazing and fuel wood. This deforestation is followed by soil erosion, exhaustion and compaction, by hydrologic changes, and finally, by desertification and abandonment.

A selection of the photographs the scientists have analyzed shows this worldwide process in startling detail.

SLIDE 40-022 This 1984 shuttle photograph of massive forest burning in the Amazon of Brazil illustrates the beginning of the process. These fires have been set to clear the tropical forest for agriculture. The smoke pall covers at least 800,000 square miles. A large number of individuals forest fire plumes are visible in the smoke-filled Amazon Basin. The Andes and the Pacific are on the horizon.

SLIDE 21-289 And yet, this large scale burning is relatively new as can be seen from this colour infrared photograph which depicts the vast undisturbed Amazon Forest of Rondonia State (the large reddish homogeneous area) as seen from Skylab in 1973. The uniformity of the scene indicates little if any disturbance to this closed-canopy tropical forest. The Rio Xingu is visible as the blue meander across the slide and the beginnings of the now-famous Brazilian Road 364 are seen as the thin white line.

SLIDE 32-087 A closer view of the early stages of the deforestation process can be seen in this 1985 shuttle photograph taken along the border between Brazil and Paraguay. The red soils of the Brazilian farms stand out compared to the more modest forest clearing in Paraguay. Similar soils exposed elsewhere have shown signs of erosion and compaction within a decade of forest clearing.

SLIDE 37-063 The largest and most intensive forest conversion project in the global tropics is the settlement of Rondonia State in the Western Amazon of Brazil. This June 1985 shuttle photograph shows large-scale grid land-clearing underway in Rondonia. The field of view in this photograph is a massive 300 by 600 kilometers (180,000 square kilometers).

SLIDE 34-040 Madagascar provides an intermediate example between the early stages of deforestation in Brazil and the final stages of desertification. Land-clearing has been underway in Madagascar since 1900 and only about 10 percent of the island now remains forested. The result is extreme soil erosion in denuded areas. As seen from space in this 1984 shuttle photograph, the red sediment clogging the estuary of the Betsiboka River in Madagascar makes it appear as if the island is bleeding into the Indian Ocean.

SLIDE 19-3052 The Sahel of Africa is the transition zone between the arid Sahara to the north and the more humid Savanna to the south. The highly publicized Sahelian drought actually began about 1968 and has continued with short interruptions to the present. Orbital photographs document the Sahelian drought and the associated desertification processes in North Africa.

Lake Niangay and the inland delta of the Niger River in Mali are an agricultural center in the Sahelian zone. This 1969 Apollo photo shows the longitudinal sand dunes that blocked the Niger River about 15,000 years ago creating the matrix of channels used in local riverine and irrigated agriculture. In 1969, agriculture and natural vegetation were well established.

SLIDE 33-054 By 1984, when this shuttle photograph was taken, the Sahelian drought had significantly reduced vegetation and agriculture in the region.

SLIDE 38-444 The shrinkage of Lake Chad over the past 20 years has been the most extensively documented tropical environmental change using orbital photography.

Located in the Western Sahel, Lake Chad is an invaluable water resource shared by four countries -- Cameroon, Chad, Niger and Nigeria. As a closed hydrologic system, fluctuations of Lake Chad serve as an excellent climatic indicator of the prolonged drought. This 1966 photograph shows the lake near its maximum surface area of 23,000 square kilometers. Although a portion of it is obscured by the Gemini capsule, correlation of this slide with an existing U.S. Defence Mapping Agency base map allowed an accurate extrapolation of the surface area.

SLIDE 39-1022 By 1982, the lake had contracted to less than 2,300 square kilometers or less than one-tenth of its 1966 surface area.

SLIDE 43-0290 One worrisome possible impact of tropical deforestation is the suggestion that regional forest removal may result in changes in the regional precipitation and temperature regimes. Evidence for this type of climatic change is yet sketchy, but patterns supporting this view already allow more cloud-free photography to be taken of deforested areas than in adjacent forested areas. This pattern has been noticed previously over the Mangrove forests of the the Lower Ganges/Brahmaputra Rivers and is possibly one reason why better photography of the Western Amazon is now more possible than during the manned Skylab missions of 1973 and 1974.

The NASA scientists who analyzed these photographs believe that the process that leads from tropical deforestation to desertification is reversible. Neither the Amazon nor Madagascar need end up in full blown desertification like the Sahel. However, the photographs from space show that degradation of the tropical environment is progressing unchecked around the globe.

The hand-held photography for manned missions fill the niche between coverage provided by aerial photography and that of unmanned satellite scanners.

Remote-sensing satellites such as the American Landsat series monitor conditions on the earth's surface using visible light but also radiation outside the visible spectrum.

These satellites perform a myriad of functions and have many applications in environmental monitoring and quality control. They can take an inventory of mineral and vegetable natural resources, monitor crop growth and harvest-readiness, track changes in the earth's ice cover, predict flooding, and even detect large schools of fish.

Canada is an acknowledged world leader in the collection and processing of remote-sensing data. The Canadian Government's Centre for Remote Sensing in Ottawa has a strong program in technology and applications development and works closely with industry, universities and other government agencies.

And Canada has developed a thriving remote-sensing industry. Canadian companies are among the world leaders in developing and manufacturing equipment for gathering and interpreting remote-sensing data.

This is a foundation we can and should build on.

Canada's Radarsat, for example, can make an invaluable contribution to sustainable development. Planned for launch in the mid-1990's, Radarsat is a Canadian-led project with United States participation.

The new synthetic aperture radar designed for Radarsat is superior to any other presently developed. From almost 800 kilometers above the earth, the satellite will circle the globe in a polar orbit, scanning the entire surface in 500 kilometer-wide swaths. The microwave sensor will penetrate cloud and darkness to produce high-resolution images of the land and oceans underneath.

Radarsat's unique sensitivity to moisture in the ground and in vegetation will open a new window on monitoring agricultural and forestry conditions. In addition, it will provide data on non-renewable resources, on hydrology and sea-ice, and weather information based on ocean surface temperatures.

Survey after survey has shown that environmental issues are a central concern of the Canadian public. Radarsat's unique capabilities in environmental monitoring could make it a very valuable tool in addressing these concerns.

Having begun this talk with a reference to the Brundtland Commission, it is fitting that I should end with one as well. The Brundtland report emphasizes the extremely valuable role remote-sensing from space can play in planetary management. But, it decries the lack of international cooperation and coordination in sharing remote-sensing information. The report calls for a major international initiative in pooling, storing and exchanging remote-sensing data.

Canada is well-positioned to take a leadership role in the international remote-sensing community and the collection of data relevant to the protection of the earth's environment. Our skills in satellite data collection and analysis, our development work on Radarsat, our involvement in the shuttle and space station, and our history of cooperation with many partners in space technology development give Canada an excellent foundation to carry forth this initiative.

Leadership in Canada in this type of effort can help strengthen our global perspective on the environment. Perhaps only when all of humanity shares this perspective can we be confident of environmentally sound development and the survival of the human race.

TITLE: Global Stewardship
SESSION: Thursday 2 p.m. Panel
BULLETIN NO.: 13

JOSE PEDRO de OLIVEIRA COSTA said to describe Brazilian conservation is a difficult task as there are an enormous amount of problems. "We are living in the Wild West of the 19th century North America. The only difference is that this time the film makers are on the side of the Indians."

The current social and economic situation in Brazil demands that the emphasis be placed on feeding and educating the population. "The government's solution, so far, has been to occupy more areas, to destroy more of the Amazon Forest and to sell whatever products can be sold, regardless of the serious possibility of desertification and all of the problems that come with it," said Costa. Currently Brazil is a food exporting country with a $120 billion (U.S.) debt.

"We need a sustained development, as do other underdeveloped countries, to develop in such a way that the country will maintain the capacity of production," he said. The World Bank has offered several hundred million dollars for the preservation of nature in Brazil and Costa said they are going to take it. "However, we need the help of anyone who can support us technically, financially, or politically. Any kind of support will be important.

"However, support will not be effective unless it is based in response to our culture and needs."

KEN PIDDINGTON stated: "Sustainable development is not just another trend." There has been a crystallization of opinion and attitudes. He submitted that the global economy is a sub-system of the biosphere and that we are entering a new era in which natural capital replaces man-made capital.

Meanwhile, the predominant attitude of Third World countries is one of distrust, said Piddington. "Their belief is that the emphasis on sustainable development by industrialized countries is just another excuse to impede advancement of their own development," he said. In other words, they resent the green conditionality attached to technology transfer.

In the last two to three years there have been rapid changes at the World Bank. Today economic development and sustainable development are mutually important. "Hydroelectrical sector linkage to nuclear creates a diplomatic mess. The World Bank will not support this linkage.

"There must be enormous collaboration among institutions, governments and non-government organizations," he said. "I personally believe that sustainable development is no passing fashion. The commitment of the World Bank is real."

DOUGLAS LINDORES stressed that there are radically different problems of sustainable development facing Third World countries compared to developed countries. "Canada has far more than her share of land and resources, low population numbers, and if we are still at the starting line in regards to sustainable development, think of where the Third World is at," said Lindores.

For the Third World the word "development" is pronounced "dilemma" and the lifestyle is a frantic fight to survive. There are no magic solutions to population problems. Economic development is very long term, said Lindores, and very capital intensive. "When they must destroy their resources to stay alive, it is not helpful to give them lectures on short-term thinking," he said. The problem in Third World countries is not ignorance or short-sightedness. Many are willing to do something. Sustainable development means raising the standard of living and empowering the people to care for their families, said Lindores.

There are 18 million new mouths to feed this year and 90 per cent of them are in developing countries. "In response, the Canadian International Development Agency has shifted away from large scale projects to human resource areas," he said. Canada's aid charter is putting poverty first and helping people to help themselves.

The basis for sustainable development is not the same everywhere. "We have to face the brutal facts. Population pressures place intolerable demands on global resources. Humility is the best possible starting point," he said.

ENVIRONMENTAL CONSERVATION IN BRAZIL TODAY

Jose Pedro de Oliveira Costa

Professor of Environmental Planning, University of Sao Paulo
Rua Conselheiro Carrao 640
Sao Paulo 01328, Brazil

To describe Brazilian conservation is a difficult task as there are an enormous amount of problems. I will try to give you a slight idea of what the country and our 8.5 million square kilometers of territory was like before the arrival of the Europeans.

We're located between two tropical forests: the Amazon forest, which takes half of the Brazilian territory and is shared with other South American countries, and on the eastern border of Brazil we have what we call the Atlantic forest, mostly on Brazilian territory. Between these two forests there is an area covered with two types of savanna vegetation: one called caatinga, which is very dry and almost unfit for human habitation, and another called cerrado, which receives more rainfall and is better suited for occupation.

The caatinga would originally represent 15 percent of the Brazilian territory, the cerrado savannas would correspond to 20 percent, the Atlantic forest 10 percent and the Amazon 50 percent of the Brazilian territory. The last 5 percent would correspond to the Pantanal zone, a freshwater marsh in the middle of the South American continent between Brazil, Bolivia and Paraguay. The Pantanal area has the largest concentration of wild fauna in all South America. It is a very important place for wilderness conservation, having a high concentration of birds, mammals, reptiles, and an enormous population of crocodiles.

After almost 500 years of colonization in Brazil, the Atlantic forest has been reduced from covering 10 percent of our original territory to covering 0.2 percent. It is the area where most of our endangered species are found. We have at least six species of primates in danger in the remainder of the Atlantic forest, among them the Muriqui, the largest monkey in the Americas. We have two wonderful species of parrots and dozens of other species ranging from mammals to butterflies, all of them threatened. Guaira Falls, as magnificent as the Iguacu Falls on the Paraguayan border, was transformed into an enormous dam for electrical energy during the military regime. Our mangroves, which are responsible for the production of marine life in the tropical region, have been mostly destroyed for the construction of ports and cities and by oil spills. The Caatinga region is undergoing desertification. The Pantanal area, where the greatest portion of fauna exists, has been assaulted by people hunting crocodiles for their skins. We know that at least one million crocodiles are killed each year. Although a great portion of the Amazon has been destroyed, it has still been better preserved than any other ecosystem in Brazil. Last year, around 10 million hectares of the Amazon forest were destroyed. Mercury is riverbeds. With the uncontrolled contamination of the Pantanal and the Amazon, the remaining Indian population is being decimated. We are living in the Wild West of the nineteenth-century North America. The only difference is that this time the film makers are on the side of the Indians, making films to try and protect them.

The current social and economic situation in Brazil is that half of our population of 150 million lives in reasonable conditions, some of them in very privileged conditions, even compared to those living in the developed nations. The other half, however, are living a subhuman, subsistence lifestyle. They are not eating enough; they do not consume enough calories. They are not receiving enough education, when they are educated at all. The policy of the government is to develop in order to feed all these people. Development means that we need exportation, we need dollars and industrialization to modernize the country. At the moment, Brazil is a food exporting country especially of soya beans, meat and several other goods, despite its poverty. The decision has been made to put more land in production to feed the people and to export. Brazil has a $120 billion American dollar debt which was not assumed through a decision of the people, but mostly by a military government that was not elected. More than $10 billion American dollars of this debt is to be paid as interest per year to the international monetary system. These problems are huge and the solution so far has been to occupy more areas, to destroy more of the Amazon forest and to sell whatever products could be sold, regardless of the serious possibility of desertification and all of the problems that come with it.

At the time the debt was made, the World Bank was financing development based on a Western definition of progress. Roads were being built and destruction was taking place. Now we are trying to find solutions to all of these problems and discussing what we should do about our debt. Population control will be necessary in order to stabilize the economy, but this has still not been adopted by our government as policy. We need to preserve the productivity of our soil, to prevent desertification and to preserve our endangered species. Traditional people will be endangered if we continue this way. The kind of development that Brazil needs is not the kind that can be translated into numbers on a piece of paper. We are not interested in this kind of development. The type of development we need is food for the people; education and medical care for our population. We almost destroyed the Atlantic forest to plant coffee in the last century. We sterilized great parts of the soil of our country and we are still destroying and sterilizing a great part of the Amazon. We need sustained development, as do other underdeveloped countries, to develop in such a way that the country will maintain the capacity of production.

The other news I have for you is that we have created several new private foundations for environmental conservation in the past two years. More than 100 NGO's are being created every three to four years and at the moment I would say that there are about 400 NGO's in Brazil. We are having big demonstrations in our cities. I live in Sao Paulo, a metropolitan area of 15 million people who are becoming concerned about the environment. A representative of NGO's was elected to the national congress. The congress was responsible for writing our new constitution with a whole chapter on the environment.

Throughout South America the story is the same: destruction of forests and of ecosystems. We need to face this reality so that we may find a strategy: we need plans and scientific effort. The tropical climate and environment calls for a different approach and different technology from the temperate climates. We need the help of anyone who can support us technically, financially or politically. Any kind of support will be important. We already have help from the World Wildlife Fund and it is very important that we have the support of the North American public. The World Bank has offered several hundred million dollars for the preservation of nature in Brazil and we are going to take it. That will change our possibilities of treating our problems. We need environmental education, to reinforce the protection of our national parks and to create new national parks. We also need a good use for developed areas. We believe we are entering a new era of treating the conservation problems of the world. It is a long and hard fight but we will succeed by all working together.

WHOSE STEWARDSHIP? A VIEW FROM THE SOUTH

Ken Piddington

Director of Environment, The World Bank
1818th Street N. W.
Washington, D. C. 20433

ABSTRACT

The division of responsibility for the global environment is a central political issue, and will continue to be so in coming decades. It is becoming increasingly evident that environmental problems do not respect national borders, but have repercussions affecting the populations, cultures and economies of many countries. Effective environmental measures will thus have to be multilateral in nature. However, there are significant differences between the views of the industrialized world and those of the South concerning the adjustments required by different nations. The equitabie and effective resolution of these differences will be a major challenge for multilateralism in the nineties.

Sustainability

The burgeoning worldwide interest in environmental issues, in particular in the linkage between sound environmental management and development, has crystallized around the term "sustainability". This reflects a change in public perception which is in my view of fundamental nature and cannot be dismissed as yet another trend, to soon be replaced by yet another burning issue.

The rather open definitions of the term "sustainability" proposed by various groups illustrate the difficulty of summarizing into a few phrases the complexities it creates for us. At this rather early stage in our understanding of the linkages between social, political, economic, and environmental factors, such lack of definition is perhaps a boon. Nevertheless, some very basic notions are central to what we mean by "sustainability", namely: that there must be limits, or thresholds, beyond which the depletion of natural resources would adversely affect the welfare of a population; and also that the needs of present generations must be met without compromising the ability of future generations to meet their own needs.

The sustainability agenda is not a revelation to anyone who has been involved in 'development work'. All the basics are there: poverty alleviation, more equitable distribution of wealth among and within nations, basic needs, etc. What has occurred is the humbling realization that the global economy, is, in its physical dimensions, a subsystem of the biosphere. In the past, economic analysis has tended to value man-made capital and growth at the expense of natural resources. We are now entering an era in which natural capital will replace man-made capital as the limiting factor in economic development. It thus becomes essential for the policy debate to tackle the shortcomings of conventional economic accounting upon which the health of global economies are generally assessed.

To the two aspects of sustainability introduced above, namely economic sustainability and environmental sustainability, a third must be added, inextricably linked to the other two: cultural sustainability. The fate of societies and cultures cannot be divorced from that of their external surroundings. History has shown us that sudden, traumatic events, as well as more gradual, longer term attacks on the natural or man-made systems supporting a society lead to the decline and impoverishment of cultures. Given the level of global interdependence and the sophistication of communication technologies, this danger may appear to not be quite as ominous today as it was some centuries ago. Nevertheless, the more isolated, vulnerable, and impoverished groups, continued to run a great risk of cultural demise. And with each culture goes a special wisdom about how to manage some part of the biosphere.

Multilateralism

The much publicized modification of the earth's major ecosystems has come about largely through the industrial and technological development that has been concentrated in the advanced industrialized countries, and through the resulting economic systems which have emerged to govern the management of global assets. This inequality in benefits has made the division of responsibility for the global environment a central political issue which will continue to challenge us in decades to come.

It is becoming increasingly evident that environmental problems do not respect national borders, but have repercussions affecting the populations, cultures and economies of many countries. The "greenhouse effect", the recent toxic waste dumping scandals, as well as the far more positive international convention on CFC's are only a few of the more obvious examples of global interdependence when it comes to environment. (We could also quote the ongoing Mauritania/Senegal violence spurred by conflict over grazing lands as one of many reminders of the security threat when there is pressure on scarce resources.) Effective environmental measures will thus have to be multilateral in nature. There are significant differences, however, between the views of the industrialized world and those of the South concerning the adjustments required by different nations. The equitable and effective resolution of these differences will be a major challenge for multilateralism in the nineties.

Issues of sovereignty and choice are central to the concerns of the Bank's borrowing countries regarding global pressures for enhanced environmental stewardship. At the same time, it is increasingly clear to all concerned that the South will inevitably be an increasingly important contributor to the various forms of environmental depletion and degradation in the future. It is thus a priority for developing countries to follow a model of development which depends on sustainability as its engine, attempting to avoid many of the pitfalls of development -- industrial or otherwise -- when it depends on deferred costs. It is also time for countries in the North to take seriously into account the international effects of their domestic patterns of resource use.

The Role of the World Bank

Over the past two or three years, the Bank's view has evolved to the point where it sees objectives such as economic development, poverty reduction and sound environmental management as mutually consistent. This is reflected in the goal of sustainable development. The guiding principle behind all project, policy and research initiatives in the Bank now is the need to move to a pattern of development which is sustainable. This has already had major effects on the Bank's project and policy activities. Environmental concerns are being systematically addressed throughout the Bank, increasingly finding their way into lending programs and policy dialogues. In terms of lending, Bank activities in several environment-related sectors such as forestry, water supply and sanitation have expanded rapidly in the past few years. In addition, several instruments have been instituted to address the integration of environment upstream in the Bank's policy-making process, and analytical policy work has been initiated in several areas.

The complexity and multidisciplinary nature of environmental issues that need to be dealt with at the project and policy level are obviously great. Some of the constraints faced by the Bank in its environmental work include the difficulty of obtaining useful information on the many variables which usually need to be taken into consideration: social, political, economic, institutional, scientific and technical. Much work is currently underway to tackle some of these difficulties.

Traditionally, the Bank has stressed the importance of macro-issues such as price and incentive structures. Even more fundamental than these issues are the very foundations of economic and social systems: income distribution, population size and growth rates, and political and cultural institutions. These factors need to be addressed in the move towards a regime of sustainable development. Tackling these rudimentary questions, their implications for policy-making and lending, will be necessary for the Bank to come to terms fully with development for sustainability.

The World Bank is often seen as an important player in the environment and development fields, perhaps more due to its 'multiplier' effect than to the actual volume of its activities. Nevertheless, no one is more aware than the Bank that environmental work must by its very nature be a collaboration of countless organizations, governments and NGO's and community groups. Perhaps the most important consideration for the Bank as it carries out its activities in all fields, but particularly in environment, is the obligation to define with the borrowing countries what the available options are, while remaining responsive to each country's necessarily unique priorities. At the same time, the donors, largely industrialized nations, also exert their influence on Bank policies. I remind you however that the Bank is not influential in the choices to be made by the industrialized countries. Without commitment from all these fronts, industrialized and developing countries, public and private interests, sustainable development at the global level will remain elusive. Happily, recent signs of a return to multilateralism instill hope for breakthroughs in the future.

DEVELOPING A SUSTAINABLE WORLD

Douglas Lindores

Senior Vice-President, Canadian International Development Agency (CIDA)
200 Promenade du Portage
Hull, Quebec K1A 0G4

Thank you for this opportunity to air my views on sustainable development. As topics go, this one is not only hot, at the end of the '80's, and fiendishly complex, but it seems likely to remain a crucial concern, under this name or some other, long after you and I have recycled ourselves.

I can't think of any better place to be tackling this subject than right here. Manitoba has offered leadership in advancing the concept of sustainable development, within Canada... by chairing the National Task Force on Environment and Economy, and - more recently - by creating a Sustainable Development Coordinating Unit that reports directly to the Premier's office. And Winnipeg, of course, is where Canada will have its own Centre for Sustainable Development, which will help, internationally, to promote this vital idea.

The theme of this conference makes a statement: 'Environment and Economy - Partners for the Future'. Or is it really a question? If so, the answer had better be 'Yes'... because, otherwise, there won't be any future. If the environment and the economy don't become partners, in the very near future, it will just be a question of which one kills the other, first.

In these remarks, I'll try to stick to a mere three of the countless aspects of this immense riddle that we have to solve:

- first, the radically different problem it presents to the developing countries;
- second, what Canada has done so far through CIDA, to help the Third World get moving in the direction of sustainable development;
- and third, what role I think could lie ahead for the Winnipeg Centre for Sustainable Development.

I guess humility is the best starting point.

Here in Canada, we've got everything going in our favour. We've got far more than our fair share of the world's land and water, lightly populated by well-educated people with access to the latest technology. We have social stability. And we are, by world standards, filthy rich. But does anyone in this room really believe that, with all these advantages, we've solved the riddle? Does anyone feel confident that Canada knows how to make its own development sustainable?

If we are still at the starting line, try for a moment to imagine how much more huge and cruel a challenge faces the developing countries.

If you were running a nation-state in, say, Africa, how would you try to make your country's development sustainable?

To be more specific, what policy would you follow to meet your people's need for some minimal amount of energy each day? Would you leave them with their traditional energy source, fuelwood, knowing that the forests are shrinking fast, and your country is turning into desert? Would you launch a hydro program, knowing it will devour huge chunks of your meager ration of foreign aid, while also flooding some of your best river-valley farmland... and for good measure, may well create a whole variety of new social and environmental problems? Would you build thermal power stations, thereby generating not only electricity but debt, fuel dependence, and pollution? Would you take the nuclear path, when your country has yet to produce a nuclear scientist, and you've seen even the superpowers choke on the mega-costs, to say nothing of Chernobyl and Three Mile Island?

It's the same in other sectors. Take food for example... would you follow the Western experts' advice, and put an end to controls, so that prices will rise, and farmers will have an incentive to produce more? Will you do this when you know that many people can barely afford enough food to keep their families alive, and higher costs for basic foodstuffs will probably mean an angry mob in the street outside your office, and killings, with your name at the top of the enemies list?

When 'lifestyle' really means a frantic scramble to survive, how much time, energy, and thought would you set aside for the concept of sustainable development? When populations are doubling in as little as 17 years, what priority would you give to a Cabinet review of Brundtland, or to reflecting on the risk of species loss?

The problem is not that Third World people are ignorant or short-sighted. Many of them - leaders and ordinary citizens alike - are every bit as concerned about the long-term future as any of us. And the women in India, for instance, who formed a human link around the trees to save their forest from a timber company... they are obviously not only thinking about the future, but more willing than most of us to actually do something to protect the environment.

The point I'm trying to hammer home is that - though the basic meaning of sustainable development is the same everywhere, and though sustainable development is in the best interests of the Third World just as much as it is for us - we had better recognize very clearly that the developing countries have a whole bunch of other urgent, life-and-death priorities contending for top spot on their agenda. When the poor are forced to destroy the resources they will need tomorrow, in order to stay alive today, it's just not very realistic to expect them to show what we would consider to be proper enthusiasm for the latest thinking about sustainable development - and it's certainly not helpful to give them condescending lectures about the folly of short-term thinking.

Let's face facts. Pressure is growing on global resources. For the Third World, 'development' should be pronounced 'dilemma'. On the one hand, what amounts to the 'mining' of a finite, depleting stock of natural resources, just to meet, sort of, today's needs... on the other hand, 80 million new mouths to feed, this year, 90 per cent of them in the Third World, as the population time bomb continues to explode (to say nothing of what used to be called, when the winds of change first began to blow, the revolution of rising expectations).

So common sense says there are limits to how much attention we can expect the Third World to pay, even to such an important concept as sustainable development. And that leads me to suggest - with what I hope is genuine humility - that those of us who have the luxury of making choices can actually play a useful role... by doing our best to think through the implications of sustainable development; by launching the process of conversion in our own society; and by helping the Third World get ready, in turn, to do the same... before we pass some unknown global point of no return.

CIDA's actions

Last year, Canada released its new Official Development Assistance strategy called Sharing Our Future. The title was deliberately chosen to echo the title of the Brundtland report, Our Common Future, and represents in itself a conscious commitment to sustainable development.

Canada's aid charter is based on four principles:

1. Putting poverty first: the primary purpose of Canada's development effort is to help the world's poorest countries and people;
2. Helping people to help themselves: Canada's aid policies must strengthen the human and institutional capacity of developing countries to solve their own problems, in harmony with their natural environment;
3. Developmental priorities must prevail in setting objectives for development assistance; as long as these priorities are met, aid objectives may take into account other foreign policy goals; and, finally,
4. Partnership is the key to strengthening the links between Canadian citizens and institutions, and those of the Third World.

With these principles as the foundation for our policy, CIDA has also identified six priorities to help focus our programs. These priorities are:

- to alleviate poverty;
- to help countries adjust their economies while also being sensitive to the social impact of adjustment programs;
- to emphasize the role of women in development;

- to foster environmentally sound programming;
- to strive for food security; and
- to emphasize energy availability.

We are now busy trying to put these principles into practice. We attempt, in all our efforts, to encourage self-reliance rather than dependence. Enabling developing countries to solve their own problems is absolutely essential if they are to achieve sustainable forms of development. CIDA is therefore making a substantial shift in its priorities and expenditures... away from large-scale capital projects, and towards human development programs, such as basic education, primary health care, and skills training.

We will be increasing the number of CIDA scholarships and training awards to foreign students, both in Canada and overseas, to 12,000 by 1992 - double the 1986 level. We are also encouraging greater cooperation between Canadian universities and those overseas.

Human resource development includes, as well, paying greater attention to the role of women. In developing societies, the part they play is closely linked to the use that is made of forests, fields and water - so programs that give women greater control over their lives contribute very directly to sustainability.

Our strategy's principles also mean emphasizing environmental concerns in development planning. Three years ago, CIDA introduced systematic measures for assessing the environmental impact of bilateral assistance projects, and for including mitigating measures in project design. In addition, CIDA is committed to helping developing countries gain more ability to manage their own environments. CIDA now spends about 20 to 25 per cent of its bilateral aid funds on projects designed to improve the management of renewable and non-renewable resources, conservation, and damage control and rehabilitation.

We've only begun implementing the principles of our new strategy. To help us, we recently commissioned the Institute for Research on Public Policy - whose director of sustainable development, Jim McNeill, served as secretary to the Brundtland Commission - to advise us on how Canada's aid programs can more effectively support sustainable policies in developing countries. Through five public forums held across the country earlier this year, the Institute has received a wide sampling of views from academics, non-governmental organizations, industry and others. These views will provide an important input as we search for the best ways to promote sustainable development. We look forward to receiving the Institute's final report.

Centre for Sustainable Development

Last fall, Prime Minister Mulroney told the United Nations General Assembly that Canada would establish a Centre in Winnipeg to promote internationally the concept of environmentally sustainable development. CIDA will contribute $5 million to this Centre over the next four to five years. This commitment remains, and has not been affected by the recent cuts in CIDA's budget.

We are collaborating closely with Environment Canada and our other federal colleagues, as well as with the Government of Manitoba, which has been a strong advocate of the Centre. Although the services that the Centre will perform are still being defined, I expect that it will build upon and draw from the many initiatives already underway across Canada to promote sustainable development.

The Centre can perhaps best be seen as the focal point for a multidisciplinary network of institutions - some in Canada, some in other countries - with expertise and skills in sustainable development. These include the University of Manitoba and the Freshwater Institute, right here in Winnipeg. By creating new linkages, the Centre can build on the current expertise of institutions already in place in Manitoba and throughout Canada. It can make that expertise more accessible, and increase its impact on the vast amount of work that lies ahead, as the world begins to move toward our still distant goal of sustainable development.

The workshop discussions at this conference will undoubtedly yield many worthwhile suggestions about the Centre's mandate and its activities. We will look forward to reviewing these, together with our federal and provincial colleagues, as we try to define how the Centre can best promote sustainable development, domestically and abroad.

For us in CIDA, sustainable development means far more than just avoiding adverse environmental effects. It also includes raising the standard of living of the poorest of the poor; it means empowering local people to provide for themselves and their families, notably through education and training; it means strengthening the ability of developing countries to manage their natural resources. These are all ambitious undertakings, and we don't expect instant successes. But we believe that by working closely with our Canadian and overseas partners, we can contribute to the development of a sustainable world - and we believe this is vital, urgent, top-priority work.

All of us here should be encouraged by the fact that the international environment is more supportive of sustainable approaches to development now than ever before. Multilateral agencies are much more aware, especially since Brundtland, about the linkages between environmental and economic issues. Developing countries themselves are realizing that the degradation of their natural resources is shutting down their development prospects.

I am confident that this increased awareness, and the widespread acceptance of the Brundtland report internationally, will help CIDA achieve the objectives we have set ourselves in Canada's new aid strategy. And I'm firmly convinced that Canada can play an important role, as an agent of change, in helping our bruised and battered world find a path to sustainable development.

TITLE: Managing Systems And
Skills For Achieving
Sustainable Development
SESSION: B.1
BULLETIN NO.: 14

BARRY SADDLER, Director, Institute of the North American West, stated that one of the keys to achieving sustainable development is environment-economy integration. At its core is requirement for a holistic and coherent policy framework which should encompass direction (goals, principles, strategies) and institutional adjustments (laws, instruments, procedures).

The task of instilling a greater degree of environmental responsibility in economic decision making involves consolidating and extending processes already in place. These include: review and overhaul of the statutory framework dealing with the environment; formalization of opportunities for public involvement; and preparation of audits to ensure procedures and practices are in conformity.

Development decision making should be based upon proactive planning, adaptive implementation, and, interactive approaches to analysis and consultation with the key being individual commitment.

Skills required include a multi-discipline perspective, a facilitation style and an activist-orientation focused on implementation and delivery of policies, plans and programs.

PETER LEBLANC, Executive Secretary, Committee of Regional Executives, Environment Canada, stated that to bring about changes the we/they, win/lose syndrome must be replaced by common win/win objectives. Environment and economy must be made inseparable in management.

Economic managers must establish credibility by factoring environmental information into their decision making and environmental managers have to replace the perception of being "restrictive" and "anti-development" with value-added to economic decision making.

Critical to creating partnerships is trust and mutual respect. Partnerships are strengthened through networks and cooperative relationships. To achieve this, strong interpersonal skills supersede direct authority.

Today's scarce resources are forcing economic and environmental managers to define interdependent agendas and to cooperate in saving time, effort and money in moving agendas forward.

SUSIE WASHINGTON, Principal, Western Environment and Social Trends Inc., focused on two issues: the need for developing a comprehensive framework and management system to identify necessary linkages and components of an environmental strategy; and, holding people accountable for their actions.

Washington stated that underlying issues in the matter of sustainable development are not exclusively scientific, technical nor economic. Rather they have much to do with structure and value systems which present conflict.

Washington emphasized that new approaches and management strategies are needed to bring less art and more science to the discussion on sustainable development. The imperatives she advocates are:

- corporate policies for environmental protection endorsed at the highest level,
- clear and unambiguous goals and objectives,
- protocols and procedures to ensure intentions are translated into deeds, and
- reporting and accountability.

Accountability, Washington said, deserves special attention. People do what the boss expects. Therefore it is imperative that organizations and government develop environment strategies to support performance. Goals must be clearly defined, Washington stated. It is against these measurable goals that managers can and should be held accountable.

DISCUSSION

- Environmental assessments and audits could be done either in-house or by outside consultants providing protocol was identified up front.
- Environmental assessments and audits should be viewed as incremental steps toward acquiring sustainable development.

ORGANISING FOR SUSTAINABILITY: MANAGEMENT SYSTEMS AND SKILLS IN SUPPORT OF ENVIRONMENT-ECONOMY INTEGRATION

Barry Sadler

Institute of the North American West
1631 Barksdale Street
Victoria, British Columbia V8N 5A8

> "Sustainable...development calls for a different approach"
> Report of the National Task Force on Environment and Economy, 1987, p.3.

INTRODUCTION

Environment and economy. The conjunction is important. It is reflective of the major shift which is taking place in conservation and development thinking. Until quite recently, the emphasis was on environmental protection or economic development. Now the focus is on integrating the two. This is identified in the landmark report of the World Commission on Environment and Development (WCED, 1987) as one of the structural keys to achieving the more sustainable forms of development which are necessary to combat global and regional change to the atmosphere and biosphere.

A follow up study of the implications for Canada by the National Task Force on Environment and Economy (NTFEE, 1987) has documented the new forms of decision making that are required to implement strategies for sustainability. It calls attention, in particular, to the importance of more integrated, proactive approaches to economic and environmental planning and management based on principles of partnership and shared responsibility. Organising for sustainability, the theme of this paper, covers the reforms to management systems and skills which must be entertained to institutionalise the recommendations of the National Task Force. The main focus of attention here is on the machinery of government decision making and the ways and means by which broadly based political consensus on sustainable development can be translated into policies, plans and practices.

Much of the discussion has been taken from work in progress and is reported in various proceedings and papers. This has been tailored to the present context without reference to initial sources, which are cited in a short concluding footnote. Wherever possible, I have tried to package ideas and concepts in diagrammatic form to conform to the conference organizers directive to keep the material relatively short and to the point.

A FRAME OF REFERENCE: DECISION MAKING FOR SUSTAINABLE DEVELOPMENT

My point of departure is the recommendations put forward by the WCED and NTFEE. Both bodies reflected and precipitated a new climate of political support for the concept of sustainable development and established an agenda for further action. As concensus documents, however, the two reports tend toward generalities rather than specifics. Much work remains to be done on a) nailing down the generalized broadly based concensus on the need for sustainable development and b) translating this into practical terms for decision making. This is the next order of business for conference participants and others who have bought into the process of forging a new partnership on environment and economy.

Definition: What is Sustainable Development?

As a generality, sustainable development means economic activity which can continue more or less indefinitely, i.e. without destruction, over-harvesting or cumulative impairment of the resource base (or significantly disrupting the well being of local communities). The bottom line according to the WCED is that sustainable development means meeting the needs of the present generation without foreclosing the options or increasing the risks for future generations (see Annex 1) From this definition, two core themes of sustainable development come into focus:

i) environment-economy integration - living within our ecological means by adjusting sectoral and regional economic growth to the capability of the resource base and biosphere.

ii) intra and inter-generational equity - fostering a greater degree of fairness in access to and use of resources.

Sustainable development, in other words, is a hybrid or transactive concept; it incorporates a commonwealth of values which links together environmental, economic and social perspectives and requirements. Figure 1 is an attempt to give visual illustration to this notion. The interlocking value sets may also be envisaged as policy frameworks, encompassing the governmental mandates which give these values force and definition in strategy and action.

Criteria: How to Evaluate Sustainability?

A more formal specification of the definition of sustainable development as a commonwealth of values begins with a goal statement. For present purposes, basic goals might be paraphrased as:

i) improving material welfare through economic growth;

ii) maintaining the functional integrity of natural systems; and

iii) promoting community well-being through choice of lifestyle and security of access to local resources

It is important to emphasize that these three goals are co-equal; i.e. one should not be systematically promoted or discounted at the expense of others. What this means, in practice, is a shift from narrowly conceived, economic objectives as a measure of development and progress to a more holistic, overriding policy construct.

Figure 2 is an attempt to set this perspective in an explicit decisional context. It identifies the economic, social and environmental criteria that are traditionally used or potentially available for policy analysis and project evaluation. The key point for emphasis is their relationship (setting aside the problems of aggregation and utility of these measures). In particular, the three criteria cannot be maximized simultaneously at either the policy or project level. A process of negotiation and trade-off (which is ultimately political) is needed to determine preferred outcomes.

The litmus test of sustainable development may be envisaged as a balanced accommodation among these goal and value sets beyond certain minimum or threshold levels represented abstractly in Figure 1. Quite obviously, this balance a) will be difficult to determine and b) will vary with conditions and circumstances. It is at this point that environmental thresholds become of fundamental importance. Because ecological limits are finite and characterized by irreversibilities, they represent the enabling condition for sustainable development.

The notion of carrying capacity in relation to development activities takes us closer to an operational grasp of environmental sustainability. It may be defined as the constancy of natural capital, i.e. resource stocks and flows plus the ecological processes which support their productive (source) and/or assimilative (sink) functions. Strictly interpreted, this sustainability criterion amounts to a requirement for zero environmental damage or no net loss of natural capital. As it stands, the criterion is unacceptable (except to deep ecologists) because it would effectively halt all forms of exploitive development. At the regional (or programme sector) level, however, the no net loss of natural capital criterion becomes much less onerous; it allows for intensive site and project specific development (subject to appropriate terms and conditions) but calls for residual impacts to be offset or compensated by environmental rehabilitation or resource enhancement within contingent areas of the regional ecosystem. This formulation frames the terms of reference for decision making and is suggestive of the process related changes which will be necessary.

INSTITUTIONAL ARRANGEMENTS FOR ENVIRONMENT-ECONOMY INTEGRATION: THEMES AND APPROACHES

The institutional arrangements we establish for decision making provide the means by which we translate ideas into action, respond to demands and interests, and cope with problems. A range of planning instruments are in place within the federal and provincial governments for the purposes of establishing and executing economic and environmental goals and objectives. A more integrated, collaborative approach is necessary for the delivery of sustainable development, in which there is is a systematic attempt to identify, weigh and relate the contingent values and interests incorporated in

Figures 1 and 2. In this sense, the idea of sustainability reinforces and focuses long standing issues of institutional design of economic and environmental decision systems.

Figure 3 summarizes certain key organizational themes and approaches. It incorporates, in particular, the nucleus of institutional reforms drawn from the WCED and NTFEE reports and indicates how these might be linked together into a "partnership" model. The emphasis is on moving from a "react and cure" to an "anticipate and prevent" approach, by building on and extending existing and emerging initiatives. While these are collectively far reaching, they do not, on the surface,individually require radical change and so conform to the empirical requirements for institutional reform.

Policy Framework

At the core of environment-economy integration is the requirement for a holistic and coherent policy framework. Such a framework involves more than just instilling ecological considerations into the highest levels of decision making (though that is one important part of correcting the existing preoccupation with "economic" considerations as the measure of societal progress and development). In initial form, the framework may be envisaged as an agenda for action which encompasses both substantive directions (goals, principles and strategies) and the institutional adjustments (laws, instruments, procedures) necessary to accomplish these. Figure 4 exemplifies the form this agenda might take.

Drafting the policy framework will be a demanding exercise for the federal and provincial governments. With few notable exceptions, there is little precedent for a partnership process of agenda building. The Round Tables now being established following the successful completion of the National Task Force process offer an obvious vehicle for this purpose, especially since their specific function is not yet clear. If the round tables assume this role, it will be fascinating to watch whether the generalized consensus evident in the National Task Force can be maintained and carried into specific agreement; for example, of the ecological principles or "givens" to be incorporated into regional or sectoral development decision making.

Environmental Accountability of Economic Agencies

The task of instilling a greater degree of environmental responsibility in economic decision making, firstly involves consolidating and extending processes which are already in place. In Canada, development agencies and industries are required to assess and manage the environmental and social effects of their activities. At both the federal and provincial level, there are well established EIA and project approval systems for overseeing development review and control. During the past decade, much effort has been directed at improving these processes.

The federal Environmental Assessment and Review Process (EARP) for example, has recently undergone a thorough scrutiny in the context of sustainable development. A National Workshop on Federal Environmental Assessment Reform contained a number of pointers regarding the kind of changes which appear necessary to encourage greater environmental responsibility on the part of development agencies, including:

1) review and overhaul of the statutory framework dealing with the environment, including its relationship to economic mandates;
2) formalization of opportunities for public involvement in decision making; and
3) preparation of audits to ensure procedures and practices conform with guidelines and standards.

The regulatory frameworks under which industry operates should also be revamped. At present, the main reliance is on technology-forcing "command and control" systems to achieve ambient standards. By most accounts, from both industry and environmental quarters, this approach is neither effective nor efficient. There are widespread violations of permitted emissions. More stringent penalties are now coming on the statute books, but it is the task of enforcement which remains at the root of the problem. Strengthening the monitoring and policing apparatus is necessary but not sufficient to achieve pollution control. This approach should be complemented by a parallel system of economic incentives to industry to encourage and promote better performance. It could be empowered through negotiated rule making (with environmental interests involved in agreements on standards) and by drawing up pollution control contracts between individual firms and the regulatory authority (with posted bonds and financial penalties for non-conformance). From an industry perspective, such an approach is consistent with the market philosophy and is supported by present trends in self-policing (such as the drafting of codes of practice, etc).

Integrated Resource Management

Development decision making is widely criticized as an unduly narrow, sectoral, project by project process. As such, the reforms discussed above with respect to the environmental responsibilities of economic agencies and industry will only take us so far. They need to be linked to more integrated systems for the on-the-ground resource management. Figure 5 sets out the lineaments of such a system (which may be conceived either in terms of a natural or multiple resource unit e.g. fishery/forest/watershed/eco-region). The elements are relatively straight forward and need not be dissected in detail here. It should be sufficient to underline the main principles and relationships among components.

An integrated process, with linked policy/planning, implementation/control and monitoring/evaluation components, is necessary to move from the "react and cure" to "anticipate and prevent" mode of management. The type of system illustrated in Figure 5 is an attempt to deal with the fundamental challenges of resource management (scientific uncertainty, value and interest based conflict and jurisdictional fragmentation) and transcend the limitations of present processes (which tend to be reactive, ad hoc, technocratic). Integrated resource management emphasizes:

1) proactive planning, oriented toward resource allocation on the basis of ecological capability matched to socio-economic demands;

2) adaptive implementation, in which there is an explicit recognition of uncertainty in outcomes backed by monitoring and evaluation to learn from experience; and
3) interactive approaches to analysis and consultation at and across different levels of decision making.

Integrated resource management systems are easy to model and call for, much more difficult to custom-design, implement and operate. A couple of observations on the feasibility of the approach recommended are worth noting in conclusion:

1) Integrated resource management does not imply a monolithic, comprehensive system; it is a strategic approach characterized by certain propositions, e.g. the more complete the prior order planning regarding resource allocation, the more streamlined should be EIA's of specific projects.
2) The main reservations about integrated resource management have to do with political commitment to the setting of goals and objectives (new windows of opportunity in this regard now appear to be opening) and the inclination and capacity of planners to make this work (when by professional training and bureaucratic socialization they may be marching to a different drum). This takes us to people and skills.

Professional Skills

Management systems are necessary but not sufficient. It is people and their personal commitment and professional skills which provide the lubricant for the machinery of decision making. No matter how imposing the institutional arrangements are on paper, this is irrelevant if the right people are not in the right places or if morale is impaired by political intervention, severe budgetary cut backs and other constraints of the kind which are very familiar in B.C. (but now show signs of being turned around).

Many of the skills required to make integrated resource management systems work are identified in the linkages among various components of Figure 3. For the record, I will abstract three which are operationally important:

1) a multidisciplinary perspective that allows resource managers and technical specialists to seek a balanced accommodation of competing interests and values;

2) a facilitation style that empowers the involvement of people whether via communication, participation or negotiation processes; and

3) an activist-orientation focussed on implementation and delivery of policies, plans and programmes including resource enhancement as well as conservation, and the rehabilitation of degraded systems as well as the impact management of new development proposals.

Table 1 summarizes the broader range of changes which will be necessary. It is based on a characterization of 'old' and 'new' experts and specifically contrasts traditional skills with the orientations and preoccupations which appear to be required for managing the transition to sustainable development. Each of us must ask where we are located within this matrix to see whether we are part of the problem or part of the solution. For governments, industry and environmental interest groups, and all those involved in the search for sustainability, Table 1 provides a starting matrix for considering organizational change in terms of human resources and professional skills.

CONCLUSION

Institutional change is necessary but not sufficient for the delivery of sustainable development. A number of fundamental issues remain unresolved concerning the rationale and conditions for attaining sustainability and the relationships with social values and behavior, industrial production and business investment, political institutions and so on. These issues, which are now exercising research and advocacy talents, are most unlikely to be quickly resolved. Ongoing work should be critical, coordinated and cast in a future-positive tense. Emphasis might be directed,for example, to charting goal and choice-oriented scenarios of sustainability, incorporating different environment-development strategies (e.g. patterns of activity, mixes of energy) and the means to achieve them (e.g. policy/institutional adjustments, technological changes, shifts in employment and consumption).

Equally obviously, we cannot afford to wait for these matters to be clarified. At all levels, the cumulative stresses being imposed on the resources and ecosystems upon which human life and livelihood ultimately depend are widespread, accelerating and demand immediate, across-the-board action. Even with our present level of understanding, simply grasping the obvious, there are many constructive steps that can be taken to strengthen the infrastructure of systems and skills on which we now rely to manage our (un)common future. Under the impetus of crisis (and absent technological fixes of the cold fusion kind), we must quicken the pace of muddling toward sustainability.

SOURCES

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ANNEX I

Definitions of Sustainable Development

..."meets the needs of the present without compromising the ability of future generations to meet their own needs".
It is "a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are made consistent with future as well as present needs".
[World Commission on Environment and Development]

"At the core of the concept of sustainable development is the requirement that current practices should not diminish the possibility of maintaining or improving living standards in the future".
[National Task Force on Environment and Economy]

Core 'Principles' of Sustainable Development

The aims of resource conservation for sustainable development are:

1. to maintain essential ecological processes and life support systems;
2. to preserve genetic diversity on which these processes and systems depend; and
3. to ensure the sustainable utilization of species and ecosystems which directly support communities and industries.

[World Conservation Strategy]

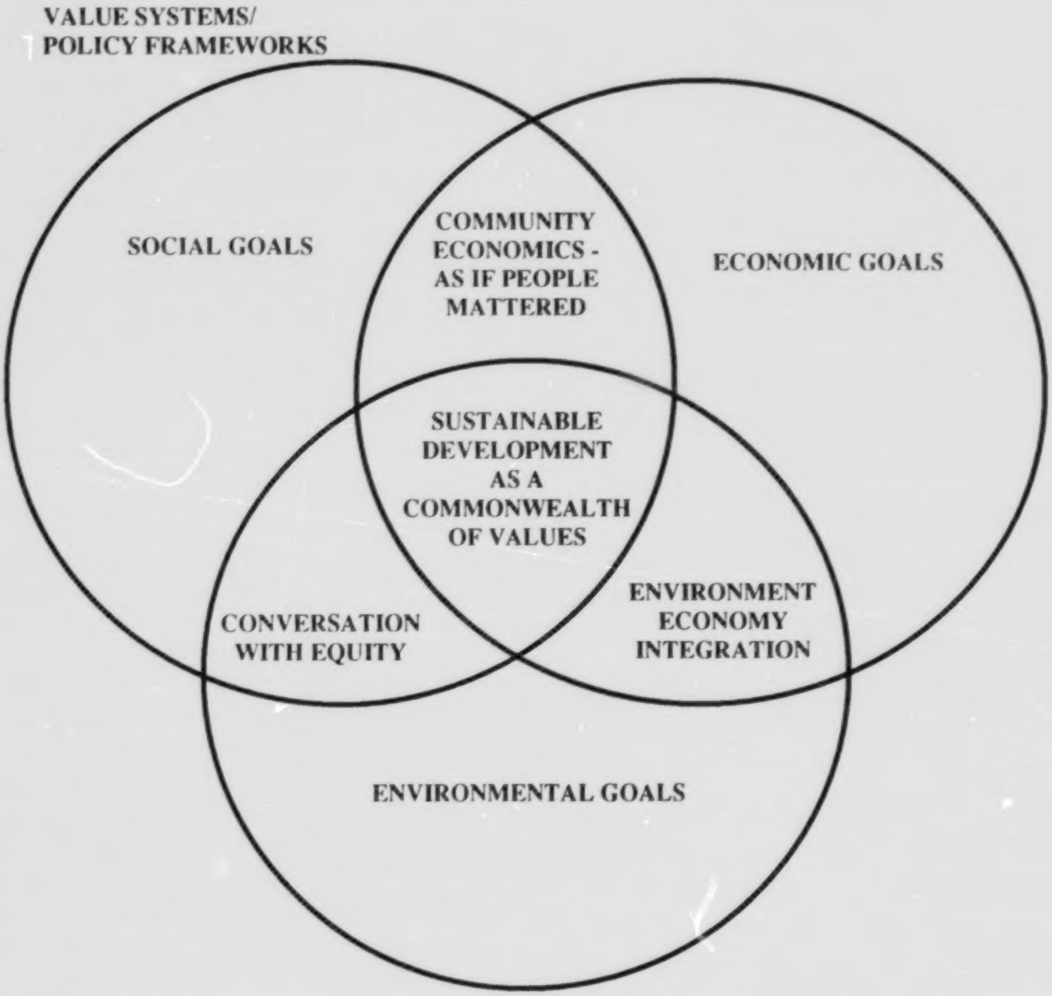
TABLE 1: Old and New Experts in Planning

Old Expert	New Expert
SOLUTION ORIENTED (defines a problem in terms of a solution)	**PROBLEM ORIENTED** (explores a situation to define the problem
- Bounded	- Unbounded
- Emphasis on primary effects	- Secondary and tertiary effects
- Simplifying	- Complexifying
- Assumption accepting	- Assumption challenging
QUESTION ANSWERING EXPERTISE	**QUESTION ASKING EXPERTISE**
- Professional	- Extra professional
- Error denying	- Error embracing
- Surprise free	- Surprise embracing
SYSTEM CLOSING	**SYSTEM OPENING**
- Elitist	- Democratic
- Technocratic	- Public
- Comforting	- Threatening
- Conflict masking	- Conflict exposing
- Product oriented	- Process oriented
ORGANIZATION CAPTIVE	**BOUNDARY SPANNING**
- Protected	- Exposed
- "Hired Gun"	- Free floating
- Institutional	- Personal
- Client oriented	- Issue opportunistic
POLITICALLY EXPLICIT	**POLITICALLY AMBIGUOUS**
- Late in political process	- Early in political process
- Choice related	- Issue formulating
- Well-defined expectations	- Uncertain expectations

SOURCE: Adapted by W. R. D. Sewell from D. N. Michael, On Learning to Plan and Planning to Learn, by Jossy-Bass, San Francisco, 1973.

FIGURE 1

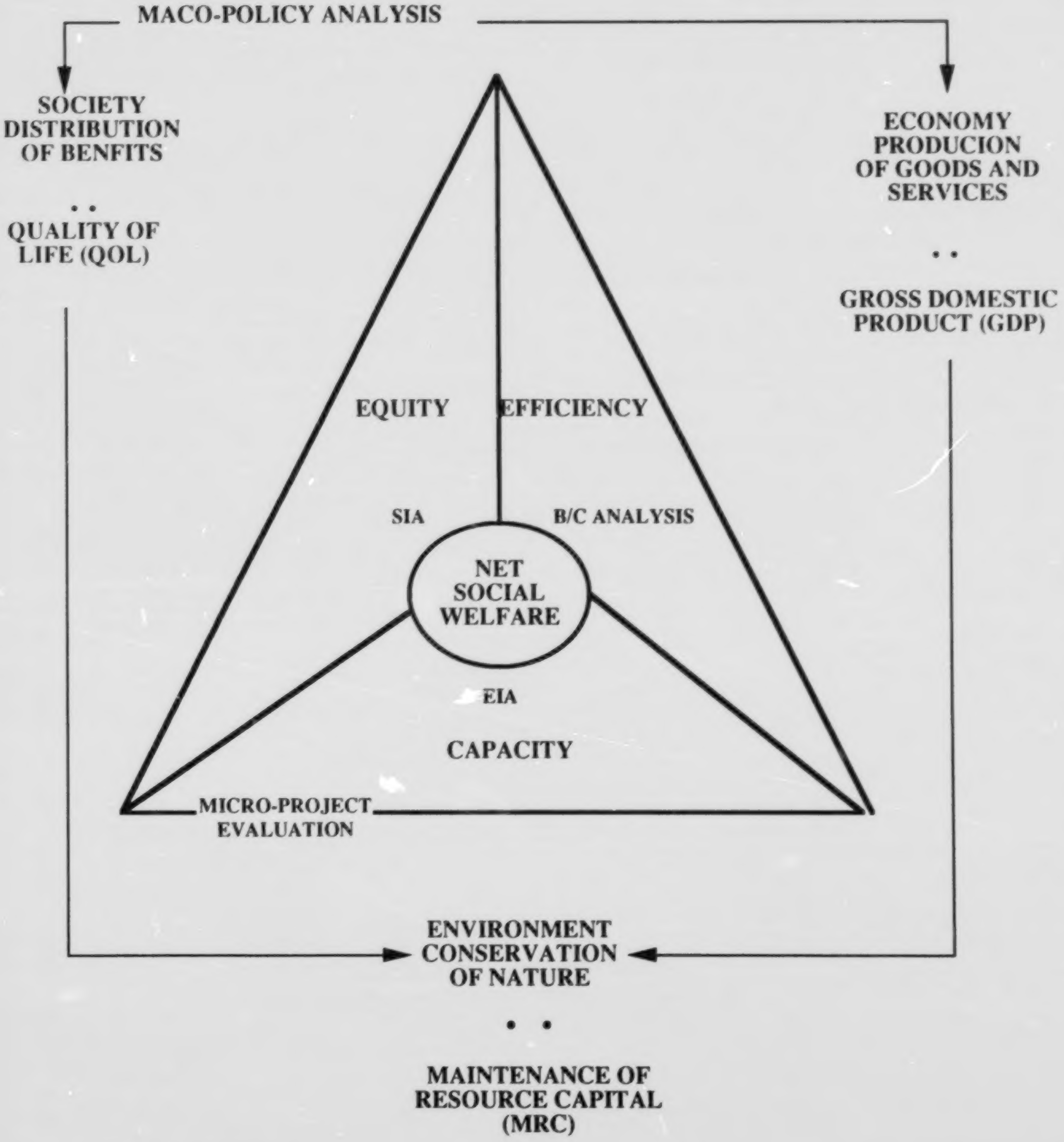
A SYSTEMS PERSPECTIVE ON SUSTAINABLE DEVELOPMENT


VALUE SYSTEMS/
POLICY FRAMEWORKS
SOCIAL GOALS
COMMUNITY ECONOMICS - AS IF PEOPLE MATTERED
ECONOMIC GOALS
SUSTAINABLE DEVELOPMENT AS A COMMONWEALTH OF VALUES
CONVERSATION WITH EQUITY
ENVIRONMENT ECONOMY INTEGRATION
ENVIRONMENTAL GOALS

SOURCE: SADLER, 1988

FIGURE 2

DECISION-MAKING FOR SUSTAINABLE DEVELOPMENT: CRITERIA AND COMPONENTS


MACO-POLICY ANALYSIS
SOCIETY
DISTRIBUTION
OF BENFITS
. .
QUALITY OF
LIFE (QOL)
ECONOMY
PRODUCION
OF GOODS AND
SERVICES
. .
GROSS DOMESTIC
PRODUCT (GDP)
EQUITY
EFFICIENCY
SIA
B/C ANALYSIS
NET
SOCIAL
WELFARE
EIA
CAPACITY
MICRO-PROJECT
EVALUATION
ENVIRONMENT
CONSERVATION
OF NATURE
• •
MAINTENANCE OF
RESOURCE CAPITAL
(MRC)

SOURCE: SADLER, 1988

FIGURE 3

INSTITUTIONAL ARRANGEMENTS FOR ENVIRONMENT-ECONOMY INTEGRATION

A PARTNERSHIP MODEL

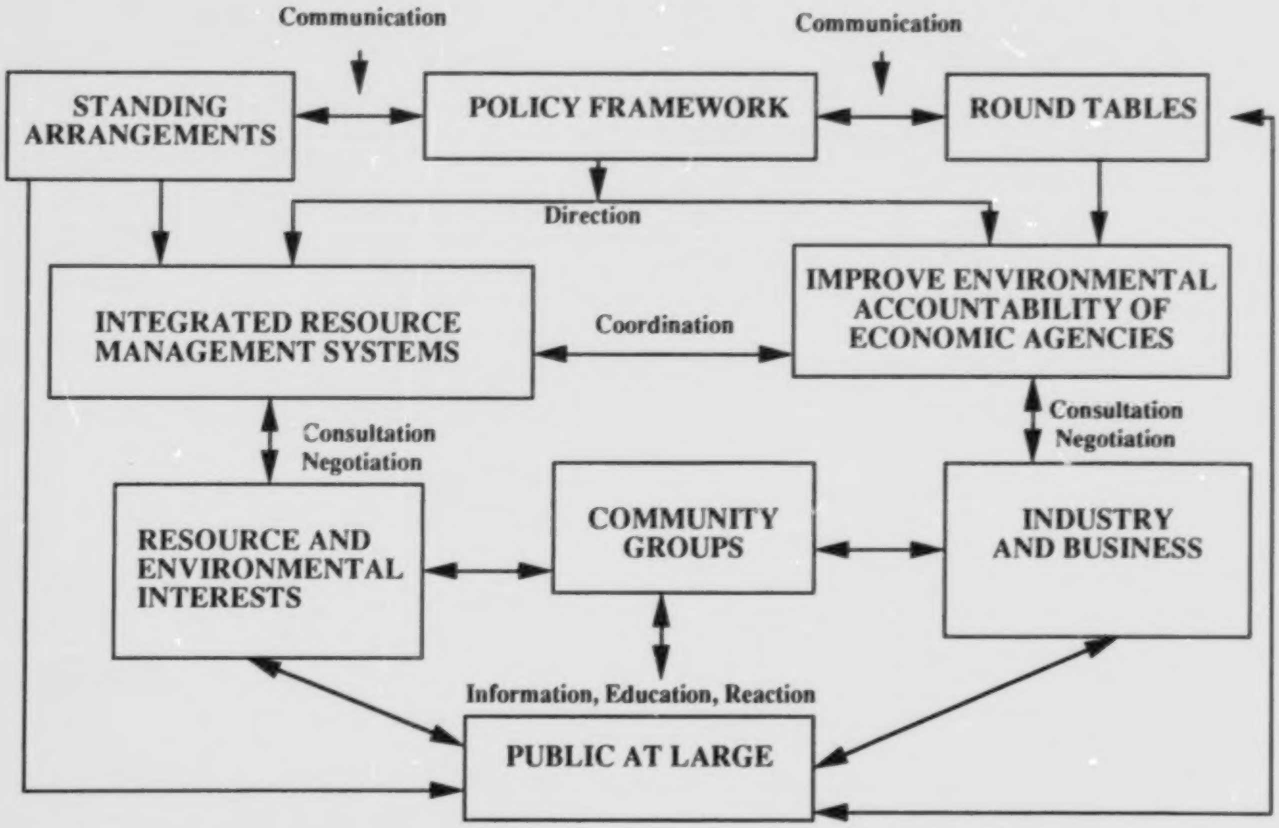
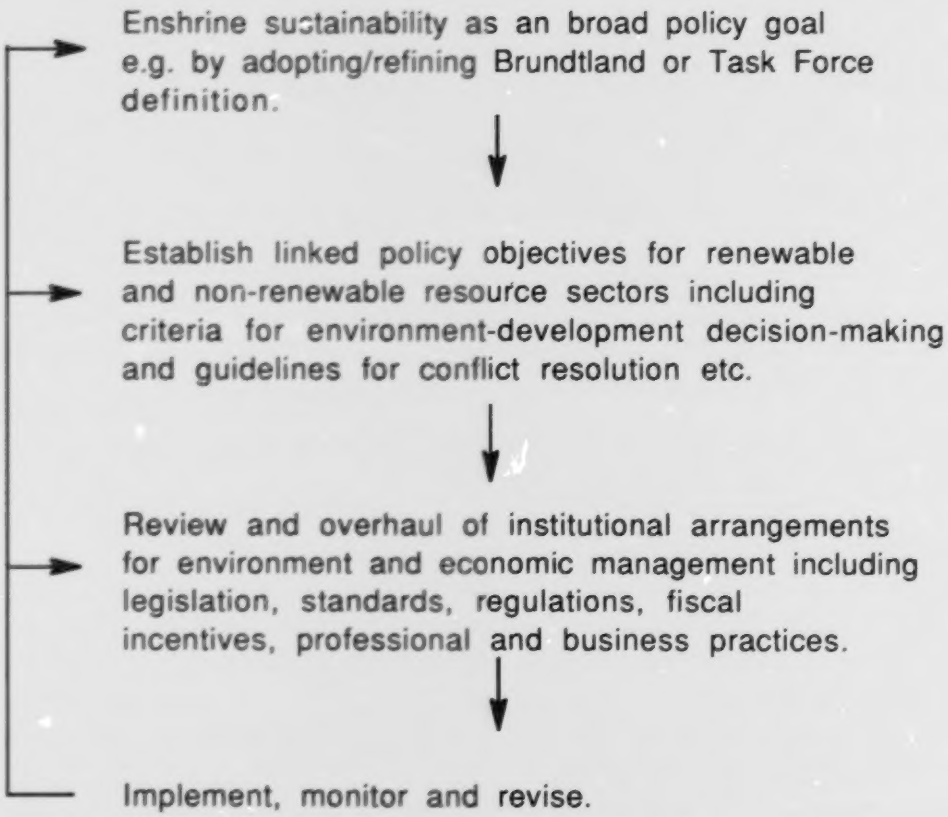

Communication
Communication
STANDING ARRANGEMENTS
POLICY FRAMEWORK
ROUND TABLES
Direction
INTEGRATED RESOURCE MANAGEMENT SYSTEMS
Coordination
IMPROVE ENVIRONMENTAL ACCOUNTABILITY OF ECONOMIC AGENCIES
Consultation Negotiation
Consultation Negotiation
RESOURCE AND ENVIRONMENTAL INTERESTS
COMMUNITY GROUPS
INDUSTRY AND BUSINESS
Information, Education, Reaction
PUBLIC AT LARGE

FIGURE 4

THE POLITICAL AGENDA OF SUSTAINABLE DEVELOPMENT



Enshrine sustainability as an broad policy goal e.g. by adopting/refining Brundtland or Task Force definition.

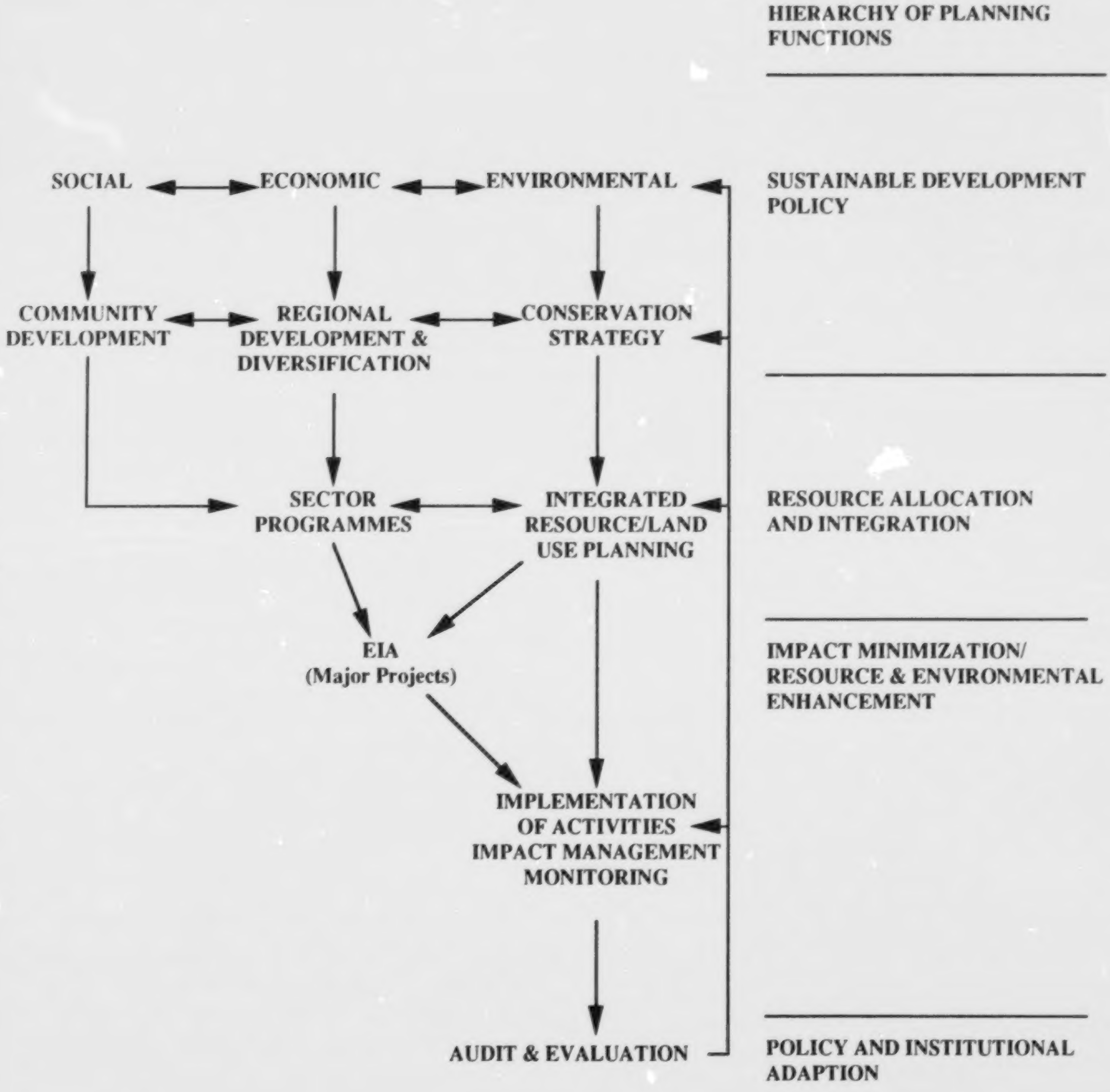
Establish linked policy objectives for renewable and non-renewable resource sectors including criteria for environment-development decision-making and guidelines for conflict resolution etc.

Review and overhaul of institutional arrangements for environment and economic management including legislation, standards, regulations, fiscal incentives, professional and business practices.

Implement, monitor and revise.

FIGURE 5

AN INTEGRATED APPROACH TO ENVIRONMENT AND DEVELOPMENT DECISION-MAKING


HIERARCHY OF PLANNING FUNCTIONS
SOCIAL
ECONOMIC
ENVIRONMENTAL
SUSTAINABLE DEVELOPMENT POLICY
COMMUNITY DEVELOPMENT
REGIONAL DEVELOPMENT & DIVERSIFICATION
CONSERVATION STRATEGY
SECTOR PROGRAMMES
INTEGRATED RESOURCE/LAND USE PLANNING
RESOURCE ALLOCATION AND INTEGRATION
EIA (Major Projects)
IMPACT MINIMIZATION/ RESOURCE & ENVIRONMENTAL ENHANCEMENT
IMPLEMENTATION OF ACTIVITIES IMPACT MANAGEMENT MONITORING
AUDIT & EVALUATION
POLICY AND INSTITUTIONAL ADAPTION

MANAGING TOWARDS SUSTAINABLE DEVELOPMENT: A MANAGER'S PERSPECTIVE

Peter Leblanc

Committee of Regional Executives, Environment Canada
15th Floor Queen Square, 45 Alderney Drive
Dartmouth, Nova Scotia B2Y 2N6

Good afternoon, ladies and gentlemen. It is a pleasure to be here with you today.

This conference, in Winnipeg, is just one of many events which have, in the past three years, addressed the need to integrate economic and environmental decision-making.

For the first time in history, we now accept the fact that human activities are undermining the stability of the world's eco-system.

We are now beginning to recognize that we can only have sound long-term economic development if we maintain (and improve) the long-term health of the environment and resource base. When our environment is at risk, our economy is also at risk. The two are linked in an equation of mutual dependence.

After four years of investigation, the Bruntland Commission issued their unanimous report "Our Common Future" in 1987. We are all aware that the report called for a new era of economic growth. Growth, though, that is environmentally sustainable.

Canada's National Task Force on Environment and Economy reinforced nationally the conclusions of the Bruntland Commission.

A common finding of both of these bodies was the need for institutional change in how we make decisions. It is on this point "of how we change the decision-making process" that I would like to dwell today.

To be successful, it is clear that we have to move the environment side of the equation into socio-economic decision-making by government, industry, and individuals. We have to put environmental factors alongside conventional economic and social criteria in developing and implementing policies, programs, and projects. We have to make environment a first thought; not an afterthought.

Sustainable Development: A New Way of Doing Business

Sustainable development is not a science or a program - it is a way of doing business. It is an optimistic philosophy that is being embraced by a wide range of sectors and individuals.

Many people find that sustainable development is a difficult concept to grasp. It is so because our traditional ways of doing things do not seem to apply or work in decision-making for sustainable development.

Nevertheless, there are some givens within which we must work and do business.

The first is that economic decision-making will, and indeed must remain within the economic sector.

The second is that traditional management skills, approaches, and processes are already proving to be inadequate for the kinds of decision-making that almost everyone agrees are called for by sustainable development. Changes in management practice, so that it features a more open and horizontal character, must also be seen as a given.

I will address these changes in management skills and approaches more fully in a moment. First, however, it is necessary to set the broader context for the introduction of these changes. Accountabilities and partnerships are the key notes.

Accountabilities and Partnerships: Owing up For Sustainable Development

There is no denying that our environment problems have been fundamentally created by economic decision-making. I do not make this statement to "point fingers" or to "lay blame". It has taken us a long time to recognize and appreciate the extent of the negative impacts which "economic only" decision-making has had on our environment. Accountability and responsibility for changes in the economic decision-making process rests with the economic side of the environment/economy equation.

However, those who operate or manage on the environment side of the equation have to bear some responsibility too. Environmental decision-makers tended to view their economic counterparts as uncaring, unconcerned and untrustworthy. Moreover, environmental managers had great difficulty seeing that their side of the equation could contribute anything of value to the decision-making processes of managers on the economic side. Economic decision-makers viewed efforts by environmental decision-makers as restrictive and naive. As a result, the well known "we/they" syndrome flourished on both sides of the decision-making equation. This highly negative evaluation, which decision-makers on both sides of the equation made of each other's values and aspirations, has led us in part to the point where the environment and sustainable development are both in peril.

Thanks to the Bruntland Commission and the National Task Force, however, there is a new found recognition that the two sides of the equation, the environment and the economy, must be made inseparable if we are to retain our prospects for the future.

The next crucial step is to make sure that the link between environment and economy becomes a reality in management, in day-to-day decision-making. That means putting in place a sense of partnership for meeting our collective responsibilities.

How do we make this happen? The first step is to recognize who is responsible and accountable for what in terms of change. The basic accountability for changes in the decision-making process rests with both sides of the equation. The responsibility for changing the economic decision-making process, such that it shows greater sensitivity to environmental considerations, rests with managers on the economic side of the equation. The responsibility for making value-added contributions to the economic process and integrating economic consideration in environmental decision-making rests with managers on the environmental side of the equation.

Both sides, in short, are accountable for establishing the process and mechanisms needed to integrate environment/economy decision-making. The old, mostly negative perceptions by managers, of managers on the other side of the equation have to be changed. Instead of perpetuating the appearance of being "restrictive" and "anti-development", environmental managers have to establish their credibility in adding value to the economic decision-making process. Instead of perpetuating the appearance of being "uncaring" and "untrustworthy", managers on the economic side of the equation have to establish their credibility by factoring environmental information into their decision-making processes.

In other words, both sides have to create a relationship that is built on trust and mutual respect for respective management concerns.

The key word is **partnership.**

A few examples might help to illustrate. A friend of mine, who is an accountant, remarked to me once that of all the business arrangements available, a partnership is the hardest to make work. The same is true in the social realm. One only has to look at the divorce rate in North America today to realize that partnerships are hard to keep going.

Now any marriage counsellor will tell you that the secret to a long and fruitful partnership is to mutually respect and trust each other and solve your problems together. We are talking no more and no less than this when we try to work towards environmentally sustainable economic development by promoting long and fruitful partnerships.

Building Managerial Partnerships for Sustainable Development

How do we build these partnerships?

Well, first of all we have to know what we want to accomplish and then how to go about doing it. I think we are all aware of what we want to see happen - sustainable economic development. The "how" presents some problems. Some of the key managerial questions are:

How do we move our agenda forward when key decisions and advice are made, and have to be made, by others, over whom we have no direct authority?

How do we implement changes in problem-solving such that the environmental and economic agendas can be moved forward as one at the same time?

How do we establish a working environment that encourages management creativity and innovation for sustainable development?

How do we avoid the destructive power struggles and adversarial relationships that seem all too pervasive in our traditional form of management?

One of the first things that has to be done, in order to develop partnerships and solid interdependent relationships, is to eliminate win-lose and lose-lose situations. We all know that the complexity of interdependent relationships can very easily lead to conflict. We have all been in the situation of win-lose, or lose-lose at one time or another. These situations often occur as a result of not facing up to resolving the conflict. Usually, conflicts are not resolved when certain things occur. We pull back into the safety of our "line" or "direct" authority. We "manage better" by eliminating any risk when we stay within the safe confines of our area of "direct authority."

If there is anything clear about managing for sustainable development, it is that we can no longer afford to treat "win-lose" situations as inevitable. We have to start creating "win-win" situations through our management practice. We can do this by taking risks, by providing leadership, by promoting innovative thinking, and creative solutions that will move the agendas of all partners forward.

Traditional management skills, honed to a fine edge within a vertical management structure, will have to be applied in the horizontal process demanded by sustainable development. How we use these skills in the traditional way in a vertical management structure is far different from how they must be used in a horizontal structure.

How do we develop the strong partnerships needed to manage sustainable development? What management skills, approaches and processes are needed to create these partnerships?

The essential thing that has to be established is credibility that will enable us to influence management decision-making by others. As far as the environmental manager is concerned, this is done by:

-establishing and maintaining an effective network of contacts

-establishing co-operative relationships, both formal and informal

-adding value to decision-making which in turn

  - creates obligations

  - creates respect

- creates friendship
- develops and maintains a track record.

To do all of this, a manager has to have a broad information base built on intelligence from a network maintained by strong interpersonal relationship skills.

It is essential that a manager knows what differences exist between managers, what their agendas are, what their goals are, what their values are, and most important, what their perceptions are. All of this must be related to your own agenda, goals, values, etc.

Now there is nothing new in talking about networks. We all know what they are, and most of us profess to having them and using them. The problem is that many of us don't have them and don't use them.

A network is something that should be constantly growing, and hence needs constant nurturing and care. It needs a substantial portion of your time. As it increases in size, it will require more of your time, because you should not only be establishing new contacts, but maintaining a relationship with the old contacts. If you want your network to serve you, you have to serve it, not just when you need to, but continously. If you only contact a member of your network occasionally, he or she will cease to be an effective part of the network. I would suggest that you have to devote a significant amount of your time to your network, up to 60% or better for senior managers or it will not be efficient.

Now there is no denying this leads to what some would consider a very complex milieu. The point is, however, that you can operate effectively in this milieu if your network provides you with the information and intelligence that will assist in establishing your credibility.

What information/intelligence do you need from your network?

- the nature of your "partners"
- what they need
- how they see the world
- what are the conflicts
- who makes the decisions
- what co-operation is needed
- who will co-operate and who will resist
- what are the areas of common agreement
- what are the opportunities.

Strong interpersonal skills and a broad information base will help establish your credibility and set the stage for cooperation. These are the main ingredients necessary to achieve your goals and move your agenda forward without direct authority.

There, of course, is the rub. That lack of direct authority in establishing the partnership between environment/economy presents a threat to most traditional managers.

A manager who works without direct authority, is almost totally dependent on the co-operation of others.

Ask a traditional manager why co-operation is difficult and he will tell you that

- priorities are different

- resources are scarce

- I don't trust them

- (silently) it could threaten my turf

But are these valid arguments? I suggest that they are not, and cannot be if there is to be management for sustainable development.

These are the ingredients that lead to conflict, win-lose or lose-lose situations. What we need to do is substitute with ingredients for making "win-win" management partnerships for sustainable development.

There certainly can be differences in priorities between partners. The key is to recognize the differences and accept the fact that they are different. There is no reason why differing priorities cannot be moved forward in a co-operative manner. We are already starting to see it happen. And it is starting to happen because some people are taking advantage of opportunities to move their agenda forward co-operatively. It's creative. It's taking that small first step together as partners that will lead to the bigger steps and the stronger partnerships.

Scarce resources! There is no question that resources are scarce today, both in the public and private sector. However, instead of approaching this problem from the negative perspective, let's look at it positively. Investing time and effort into developing partnerships can actually increase the impact of individual resource bases. Five organizations working together in a co-operative partnership can provide more resources to move interdependent agendas forward than one can alone. As well, the wise investment of the scarce resources of time and money into developing co-operation can provide the greatest pay back in the long term.

Lack of trust is again a real problem which will take a long time to overcome. It is in this area that most managers perceive the greatest risk. To develop trust, you have to be willing to take risks. You have to be willing to provide advice, assistance and add value to the decision-making process of others with no guarantees. There are all kinds of reasons why managers resist the trust approach, the least of which is perceived as "no return for investment"; and that will happen some of the time. But, if you keep at it and add real value to the decision-making process, you will create obligations, create respect, and start to develop trust. The risks are high at the beginning, but they will be reduced as trust develops.

Last, but not least, the silent problem -- "A threat to my turf". There is nothing more destructive and more common in management today than this approach. Turf battles, which are common to all sectors today, are one of the biggest restraints to managing co-operative partnerships.

I have no magic solution to solve this "turf" problem completely, but I do know that it stands in the way of management for sustainable development and must constantly be fought against.

Part of the solution to the "turf problem lies in institutional change: change that will give a manager credit for being one player of many in co-operative problem solving; change that will encourage managers to operate efficiently in their line management responsibilities as well as in their horizontal management responsibilities.

Finally, there is "added value" in decision-making, and I am speaking here as one environmental manager to other environmental managers, though the point applies to economic managers as well. This is simply the process of investing some time and resources in providing advice and assistance to your partners that will enable them to move their agendas forward easier and more effectively, as well as moving yours along with it. This means, of course, that you have to know their agendas and know them well. It means that you have to recognize situations where moving their agendas forward will move your agenda forward.

It requires little effort at times and a lot of effort at other times, but the rewards are many. When you provide this type of assistance, you are automatically creating a situation where obligation and respect is developed. When this happens, the partnership is strengthened. If you truly add value to their decision-making process, you have set the stage for further co-operation because you have created respect and are on the way to developing and maintaining a positive track record with your partners. I must caution here that the pay back on value added can be immediate or at times only visible over the longer term.

Conclusion

What I have been suggesting for the last twenty minutes is that in order to move towards sustainable development, we have to manage in a style that will create strong partnerships. These partnerships are effective only if, as managers, we establish credibility which is obtained by having a strong network, by establishing co-operative relationships, and by adding value to the decision-making of those who directly or indirectly have influence on our agenda. It is through partnerships that we will be able to achieve environmentally sustainable economic development. Our management task is to make them happen.

DEVELOPING AN ENVIRONMENTAL MANAGEMENT SYSTEM A STEP TOWARDS SUSTAINABLE DEVELOPMENT

Susie Washington

Western Environmental and Social Trends Inc.
#1270-6th Avenue S. W.
Calgary, Alberta T2P 2R9

By this point in the conference proceedings everybody in this room is probably growing weary of hearing about sustainable development and the need to integrate environmental considerations into decision-making. Yet the reality remains that, while many pieces of an environmental strategy are already in place in both the Canadian private and public sectors, an integrated and comprehensive framework for decision-making is needed before we can lay claim to leadership in the field of sustainable development. Therefore, my discussion today focuses on two issues:

- the need for developing a comprehensive framework and management system within organizations to identify the necessary linkages and components of an environmental management strategy; and
- the need to hold people accountable for their actions.

I will also offer a few examples of how we might work toward achieving sustainable development within organizations.

By way of background, it may be useful for you to understand that I spend approximately 50% of my time these days working with both public and private sector clients helping them to think about and re-design their decision-making processes to enable them to become more responsive to external pressures. If I have any insights to offer this group, (from my worm's eye view of organizations) the underlying issues in the matter of sustainable development are by no means exclusively scientific, technical or even economic. Rather they have much to do with structure and, as Peter Barry suggests, value systems and as such present us with a very interesting conflict. On the one hand are the external factors -- the legal and global imperatives to integrate environmental protection into decision-making, the desire to maintain current standards of living, the rise of special interest groups and the lack of public trust in government or industry (indeed, especially industry) to protect their interests. In other words, there is an overriding need to cope with and manage rapid social change and rare indeed are the senior executives who do not sense that need. On the other hand, decision-making systems and institutional arrangements within organizations are generally inadequate to cope with this rapid social change and value systems tend to discourage short run institutional sacrifices on the grounds that they are too rigorous or costly. Thus, to meet the long term challenge of sustainable development, the short term challenge is to design and implement effective environmental management strategies which reconcile these seemingly competing and conflicting demands.

In approaching that challenge, many organizations are hamstrung by internal systems which have tended to treat environmental management as a frill or an add-on -- one which occupies a place in the corporate pecking-order somewhat akin to the donations committee. What needs to be done in and for those organizations is to integrate environmental management performance -- from planning to decommissioning -- into the management mainstream and to subject it to the same rigorous tests and disciplines that are used to track and enhance results in the rest of the organization's business.

To put it simply, new approaches and management strategies are needed in order to bring less art and more science to the discussion of sustainable development. Thus, I believe that to meet the challenge of the future, organizations will need to bring to environmental management the same types of imperatives which they would regard as routine in other areas of their business. They include:

- corporate policies for environmental protection which have been endorsed at the highest level of the organization;

- clear and unambiguous goals and objectives which are stated in ways which facilitate the measurement of results;

- protocols and procedures, (like timely environmental assessment, monitoring and audits) which ensure that good intentions will be translated into good deeds; and

- reporting and accountability mechanisms which ensure appropriate action and follow-up.

The later point -- accountability -- is one which deserves special emphasis. It is sad, but none the less true, that people tend to do what the boss inspects. In organizations where senior management understands that poor environmental performance can be very costly, asking questions about environmental management is a matter of routine practice. Absent that kind of attention, however, or in a management culture which focuses on bottom-line results without regard for how they are achieved, expectations of good environmental management may never get farther than the boardroom.

Lest you might think that I am pessimistic -- or worse, cynical -- let me tell you that I am neither. As I said a few minutes ago, rare indeed these days are executives who do not sense the need to cope with and respond to rapid social change as part of their business and management strategy. (And, of course, the possibility of a fine or a jail term also gets their attention!) Accordingly, and for whatever reason, the willingness of business and government to develop environmental management strategies is encouraging and should give us all much cause for optimism. With that in mind, I would like to look again, and in more detail, at how an environmental strategy can support organizational performance in response to the constantly evolving social, economic, business and regulatory climate.

Specifically, an environmental management strategy identifies the key outputs of increased management effectiveness and enables organizations to:

- ensure responsible behaviour in environmental matters with respect to all aspects of decision-making (in the resource sector this includes planning through to decommissioning);

- help managers understand the interrelationships between environmental protection and economic activity -- of any kind;

- help line managers achieve the environmental objectives set by the organization including:
    - regulations; and
    - compliance priorities;

- increase overall awareness and ownership of environmental protection by all employees;

- improve an organization's risk management system;

- provide objective information and feedback to senior management so that policies and procedures can be revised as needed; and

- in a nutshell, ensure development of an overall environmental management control system for the organization.

What does all of this mean in operational terms?

It is important to understand that a key element contributing to the success of a workable environmental management strategy and framework is the extent to which people at all levels fully understand and respond to the regulations and procedures which govern their operations. Thus, managing information flows and decision-making with respect to environmental protection (the management part of sustainable development) is essential to ensuring that policies and procedures get beyond the boardrooms, are practised at the grass roots level, and that information moves upwards to managers and decision-makers as well as downwards. Moreover, there are two sides to information management. However important internal information management is to ensuring that things are getting done properly, as Barry suggests, the external dimension is equally important because of its impact on relations with other stakeholders. (I believe Charlie Ferguson and Leslie Whitby are speaking on this down the hall.)

It is important to remind you again that another key element in successful environmental management strategy is the need for clear, well-defined and measurable goals and the means to ensure that people are held to account for their performance. Where goals are ambiguous or, worse yet, where different value systems are operative within the same organization, cost effective environmental practice and proactive measures tend to fall through the cracks.

For example, in some companies with which I have worked the operations and environment departments operate in what is almost two solitudes. One gets its rewards for producing quickly and at least cost. The other gets its rewards for cleaning up. Both do their work extremely well but neither is under any obligation to observe the norms and concerns of the other. As a result, cost effective and pro-active environmental protection options often fail to surface simply because there is no institutional pressure to make them surface.

Much the same can be said of governments. In the public sector, environmental departments most often insist on EIA's for projects such as highways, airports, energy developments and even dams.

Indeed, EIA's are used as a stop-go mechanism after the project proposal has been developed. However, they are under-used in terms of monitoring and control and are never used to analyze options for incorporating environmental concerns into government policy.

To put it simply, an effective environmental management strategy requires a coordinated and integrated approach to planning, organizational dynamics, communication, review and follow-up. All of these must be supported by a system that documents information in an organized way. Most importantly, none of these elements on its own provides a quick fix, rather they must be parts of an integrated approach.

From my experience, while none of this is new, it represents for many managers a significant departure from traditional institutional arrangements, decision-making approaches and easy routine. However, in the long-run, a successful effort pays off handsomely for organizations -- in improved environmental management performance, and of equal importance, in improved external perceptions of the organizations overall sensitivity and responsiveness to environmental concerns.

By now you may have noticed that I continually lay stress on data collection, information flows and the use of these to hold people to account for their actions. Bearing in mind my assertion that people do what the boss inspects, it will come as no surprise to you that I believe that environmental audits, just like their counterparts on the financial side, are crucial to successful environmental management.

Environmental audits are a powerful tool because they provide a framework and a process for the collection and presentation of information about performance. In effect, they are the medium through which the boss finds out whether what was supposed to happen actually did happen and they also provide the boss with important guidance about what needs to be fixed and how to fix it.

This brings me full circle. You will remember my brief discussion, at the beginning of my presentation, of the structure and value system conflict. Even though most organizations are aware of and concerned about the environment (physical and social), they are unwilling to make institutional sacrifices which seem too rigorous. And even if people at the top are prepared to make changes and ask questions throughout the organization there remains the need to establish controls, monitor performance and, as Peter has suggested, to reward good behaviour and provide incentives to be innovative and creative in dealing with environmental protection. And we need to do it now. The pace of change which institutions need to manage more effectively is almost certain to quicken.

Thank you.

TITLE: Monitoring Advances in Sustainable Development.
SESSION: B.2
BULLETIN NO.: 15

MICHAEL KEATING, stated that: "We will only achieve a sustainable society by mobilizing people everywhere to understand and implement change and that communications is the key to progress." He then pointed out that without communications there can be no progress.

Change was initiated with the Brundtland Commission Report which was but a brief flash. The Report of the National Task Force revived the issue but there was not much media follow-up. Thus "the great ideas from groups like Brundtland remain bottled up as far as most people are concerned."

The media can, according to Keating, be a catalyst for change but they "tend to be followers rather than leaders." One reason that so little is written about sustainable development is that there is little articulate leadership by opinion leaders. "Many editors still react to environmental issues with a police beat mentality" added Keating. "That means that many environment stories are superficial and some are just plain wrong."

But we can communicate through newsletters which are pro-active and timely; through the visual media which "gets right to the heart," and, through the Press. Stories must, however, be specific and easily understood. They must have hard facts and provide solid information.

"What do we need" to bring about the change?

. A sustainable development reporting system;
. A public debate of the magnitude of our language and culture debates; and
. A Centre for Sustainable Development.

DOUGLAS MILLER, addressed the questions of "How do we measure progress in sustainable development? Where are we now?" and "What do we do next?"

Mr. Miller indicated that we are dealing with change which can be incremental or fundamental. We are good at incremental change, bad at fundamental change. The trick is to manage incremental change to achieve fundamental change. This requires planning to use our energies to best advantage.

Miller indicated that we are in the early stages of the change process. "It starts with articulators, moves on to early adapters, to mainstream changers and ends with followers and resisters." The media inputs to the change process between each set of change actors. Public opinion research, media content analysis and tailored research on key decision makers are the major ways of monitoring change. Current research indicates that "Environment is the #1 issue because 89% of Canadians feel that health has already been affected by pollution, 73% believe that pollution is a major cause of cancer and 93% believe there are many unknown environmental hazards affecting health," he said. Miller stated that the corporate sector is aware of sustainable development but that few understand it and opportunities are rarely identified. "Corporations are convinced that the environment is a fundamental and long term issue but business prefers a "carrot and stick" approach to environmental change" he said. This indicates that government leadership is needed.

The next steps to bring about the necessary changes include: solidification of leadership; mobilization of innovators; building of infrastructure; and, telling the story," said Miller.

DISCUSSION

There is no media coverage because there is nothing to report. There is a need to introduce change and strategies will accomplish this.

A "Code of Practice for Sustainable Development" needs to be prepared. Quebec is working on a code.

A measurement called "Sustainable Domestic Product" needs to be developed to measure movement towards a sustainable society.

The sustainable development process must be simplified. This means that people should be told what they can do today and tomorrow.

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MARKING CHANGES FOR THE BETTER
MONITORING ADVANCES IN SUSTAINABLE DEVELOPMENT

Michael Keating

Environment Writer & Consultant
10 Aster Avenue
Toronto, Ontario M4Q 3M2

ABSTRACT

The speech explores how Canada has been tracking the debate on sustainable development and how we can do a better job. It highlights the importance of communications and talks about some of the successes and failures in explaining the complex ideas in environment and economy linkages.

Much of the focus is on the news media, which play a catalytic role in shaping public policy. By publishing information about the deteriorating state of the environment, the media have created pressure for action on the part of government and industry. But they have failed to follow up with a good explanation of what we are going to do to change.

There are a few experienced environment reporters and the majority of coverage is done by people with little expertise in the issues. This largely reactive mode means that the media are usually waiting for the message.

If people involved in sustainable development want to get their complex and sophisticated message out to the public to build support for the great changes needed, they will have to do a better job in communicating.

Good afternoon ladies and gentlemen. Bonjour mesdames and messieurs et merci de votre invitation.

If we are going to talk about monitoring advances is sustainable development then we must talk about two things. One is the importance role of communication and its players. The second is the improvements in communication that are needed.

It is a basic fact that we will only achieve a move to a sustainable society by mobilizing people everywhere to understand and implement change.

And it is another basic fact of life that without communications there can be no progress. The information about problems and the ideas for new directions will remain bottled up and we will fail to make changes in time to save our biosphere.

Well, how do we communicate ideas about what will be some of the greatest changes in human history?

Let's start with a quick report on what has been done in communication.

The breakthrough at a global level and in Canada obviously came with the Brundtland Report two years ago. For the first time you had a high-level group, including policy makers, not just scientists, talking about the need major changes in the evolution of technological civilization in order to maintain a healthy environment.

The report had a major impact on the minds of many key people in Canada and in other countries. But as far as the public at large was concerned, Brundtland was a brief flash across the horizon of newspaper headlines. Then it vanished.

In Canada we had the National Task Force report just a few months later. That revived the issue and injected it into our political system to at least a modest degree. Again, on the broad public front, we had a couple of stories in the media but not much follow-up.

Since 1987 the term sustainable development has periodically popped up on the public agenda in newspaper articles, particularly in commentary pieces, in some documents from governments and special interest groups and in speeches by a handful of political, business and environment leaders.

The media throw the phrase into a story once in a while but rarely explain it.

So, we have introduced the idea of sustainability to the public agenda. But I would say that mostly the great ideas from groups like Brundtland and the National Task Force remain bottled up as far as most people are concerned in their daily life.

One major problem is that too many of our opinion leaders, our first ministers, captains of industry, labor, religious and other spokespeople for our civilization appear to be still mired in the past.

Too often they seem either explicitly or implicitly to accept the old line that modifying development to conserve the environment will lead us back to a primitive and therefore uncomfortable society, one in which people led lives that were, "nasty, brutish and short."

This leads to a direct problem in communication, particularly with the news media because the media tend to be followers rather than leaders. So little is being written about sustainable development because there is little articulate leadership by the opinion leaders who traditionally get quoted.

Well, what about the media and how they operate?

Clearly they play a catalytic role in shaping public policy. By publishing information about the deteriorating state of the environment, the media create pressure for action on the part of government and industry.

Let's look at how the media do cover the environment. Crisis and confrontation still makes the world go round in the head of a news editor.

Many editors still react to environmental issues with a police beat mentality. Oh, gosh, there has just been a chemical spill. Quick, grab a general assignment reporter and send them out there and see if they can figure out what is going on.

That means that many of the environment stories are superficial and some are just plain wrong.

And much of our environment writing will remain superficial level. Most editors have been reluctant to commit the time and money to support good, in-depth environmental coverage. Our news media still have far more reporters and do a far better job reporting about sports, fashion and movies than they do in describing the fate of the earth.

As a result the media are implicitly sending a mixed environmental message to the public.

For example our newspapers say on one page that the environment is in serious trouble. On other pages they analyze the stock market and other economic indicators and promote consumption of threatened resources without dealing with the obvious conflicts.

Let me give you an example of how this plays out in the journalistic world of The Globe and Mail, where I used to work.

When I quoted the Brundtland Report as saying that environmental destruction was as great a threat as nuclear war, that made page one.

But when I wrote about the National Task Force on Environment and Economy saying that we could save the environment the story was put far inside the paper.

In my mind both were historic documents but the editors only saw the crisis story as big news.

Well, where do I see news coverage going?

It is and it will slowly improve despite some barriers, including suspicions among some media people that sustainable development is merely a code word for big business to talk about the environment but to avoid change.

And more sophisticated media coverage will be slow in coming because many journalists have failed to take time to understand the issues. So they are not able to tap into the new thinking until the people they look to for quotes and ideas do a better job spelling out the concepts.

That comes back to my point about what are viewed as the quotable sources of information-- the people who make the news.

Let's deal with the role of governments, the source of much of the grist for journalistic mills.

In the past governments have done a spotty job of telling the world the truth about the state of the environment. Some have been very candid in identifying problems and specific polluters. Others have literally buried reports and failed to fund a staff which would even find problems.

When it comes to sustainable development they have been, at best, muted in their public comments. Some of our government leaders have talked about sustainability but I have yet to hear one make it a top government priority, or at least articulate it in a way which grabbed the headlines.

How can governments fire up the issue?

First, they can do a much better and more consistent job of issuing reports about the state of the environment. These reports must clearly spell out the problems, who is responsible and what has to be done.

Second, they can do a better job of explaining what sustainable development means and how it can be implemented. Many of the ideas will come from other sources but governments can act as collectors of information and can use their communications systems to spread them.

Governments need to report real policy changes and actual progress. They have to start talking about new laws, policies, regulations, negotiations, treaties, financial incentives and disincentives.

They need to flesh out the ideas with reports and discussion papers which not only explore the poorly-charted territory of sustainability but which commit governments to making changes.

Now to business, a new player in the field of environmental debates.

Business in general, if I can use that very loose term, still does not have a very coherent idea of what sustainable development is let alone where it is going.

However business people know that change is in the wind. Their noses are up, they are sniffing for signals, and they will change because they have to in order to survive.

Some business leaders have seen new directions and are off and running. Others have failed to take the time to understand the changes that they must make.

So what can business contribute to the accountability?

Most importantly it can demonstrate how to make change for the better and stay in business.

It's fine for businesses to brag about cleaning up pollution problems but they need to develop the flip side of this public relations campaign. They need to spell out how they intend to deliver both old and new products and services in a way that will preserve the biosphere. This will be the substance of sustainability.

What communications tools are available to business?

First they can use public speeches. Some business members of the National Task Force have used this tool well and have given a lot of speeches to business audiences, talking about change. They are often being interviewed by various communications media and this is helping to get the message out.

They can use of corporate reports, which are a lower-profile but highly convincing ways of signalling change.

And, finally, they will communicate change through their products. When they demonstrate ways of farming, fishing, logging, providing shelter, food and health care and all the other essentials of life in sustainable ways then the message will be loud and clear.

In the meantime there will be a need for people to ride herd on the state of our environment--independent people who do not have an economic or political interest in the status quo.

First come the environmentalists and environment groups. They have been the source and the repository of many of the best ideas about sustainability for decades.

Environmentalists communicate through newsletters, pamphlets, press releases and public speaking. In many cases, because these groups are often small and lack expertise, they fail to reach a wide audience on a continuing basis. There is no simple solution for that except for people to contribute more to such groups in the belief that a democracy needs more articulate voices of comment and criticism.

Another problem faced by the environment community is one of switching horses to sustainability. Some have rejected the concept and have opted to remain as hard-edged critics of the system, a role that needs to be maintained.

Those environmentalists who have tried to carry the message of sustainability find it difficult to get into the mainstream media. First, the media tend to look to the groups for hard news about the polluter of the day and second the ideas around sustainability are often somewhat vague when one deals with them at the grand level of the state of the world.

Where environment groups have been successful in reaching the public on sustainable development it has come when groups have pointed to specific cases where change has worked or where it could work and they have provided the evidence.

Another group of social critics with many good ideas is labelled as academe.

Their public contribution to the debate on sustainability has been in writing critical articles in journals and the press, speaking at public meetings and participating in panels such as the Task Force and round tables.

If they have a fault as a group it is that they need someone to boil down some of their ideas into everyday language so they can be more usable.

Well, my speech so far has been heavy on problems and need for change in communication.

Where do we go from here?

We could certainly use better understanding by the media of what is happening, what could happen, and what must happen to achieve sustainability. We could use better media training because without informed reporters we will not get informed stories.

From other players, like governments, we need better state of the environment reporting to monitor changes for the worse and for the better. Without fast and frequent updates we risk having slow progress.

And we need a sustainability reporting system. This would use the state of the environment system as its base for exploring ways of doing things in ways which do not undermine the environment.

What is this reporting system?

It is a way of telling us what we are doing that is working, that is cleaning up the environment or is not harming it in the first place. So it is a report card. It can also be be a screening mechanism for new proposals. One would use it measure whether development proposals would improve or degrade the biosphere.

But these are just tools to build something.

If we are going to get them in place and in use we will need public understanding and public support for big changes ahead.

To bring the ideas together this country needs a major national debate on sustainable development, a debate as great as any we have had in the past over our languages, our politics or our culture.

We do not a bad job of public debates in this country.

We have conducted major debates on education, communications media, bilinguallism, various parts of our justice and business system. Thomas Berger explored the environment and sustainability in the north.

I think and hope that the new Round Tables on Environment and Economy can be major players in conducting public debates on sustainability. I hope they will be very open groups that meet in public, sound out public opinion and give a sense of positive direction to the country.

We also have the foundations for another group, an International Centre for Sustainable Development here in Winnipeg. That is in the early planning stages but it can be a window on the world for people in Canada working on sustainable development.

It should be a two-way window. We can share our debate and our ideas with the world and we can learn from the many people with good ideas and sustainable lifestyles in other parts of the world.

Let me wrap up with where I see the public debate on sustainability going.

Despite my feeling that the news organizations have done a poor job preparing themselves for the debate on sustainability they can react quickly. There is a new, younger generation of reporters and editors coming into place, people who have grown up during the environmental debates and people who realize how important they are.

We need to give them better information to work with.

It will be up to people like those at this meeting to get the message of change into the public debate and to focus on good ideas wherever they find them.

People are becoming frightened about the state and future of our environment. They know that change is coming. Now they need the opinion leaders who they respect to start showing the way.

Then we will have changes to record and to show that our civilization is not one doomed to extinction by self-indulgence.

Thank you very much and good luck.

MARKETING THE TRANSITION TO SUSTAINABLE DEVELOPMENT

Doug Miller,

President, Synergistics Consulting Ltd.
4th Floor, 54 Berkeley Street
Toronto, Ontario M5A 2W4

Good afternoon! It is a pleasure to address this watershed conference, and a particular pleasure to be participating with Michael Keating in this workshop on "Monitoring Advances in Sustainable Development".

In attempting to do justice to this ambitious title, I'm going to try to give brief answers to four key questions, namely:

1. How do we market a big change like "sustainable development"?

2. How do we monitor our progress?

3. Where are we now? (Specifically, what are the current attitudes and behaviours of the Canadian public *and* corporate executives towards sustainable development?) And,

4. What are some of the next steps in promoting sustainable development in Canada?

How do we market change? That all depends on what kind of change we're talking about. There are basically two kinds of change: incremental and fundamental. Changing your brand of cigarettes is an incremental change. Stopping smoking is fundamental. Switching to unleaded fuel is incremental; while conserving transport fuels is fundamental.

By far the change our society and our marketers pay most attention to (and apply most money to) is incremental change. That's also about all most of us are comfortable with in our own lives.

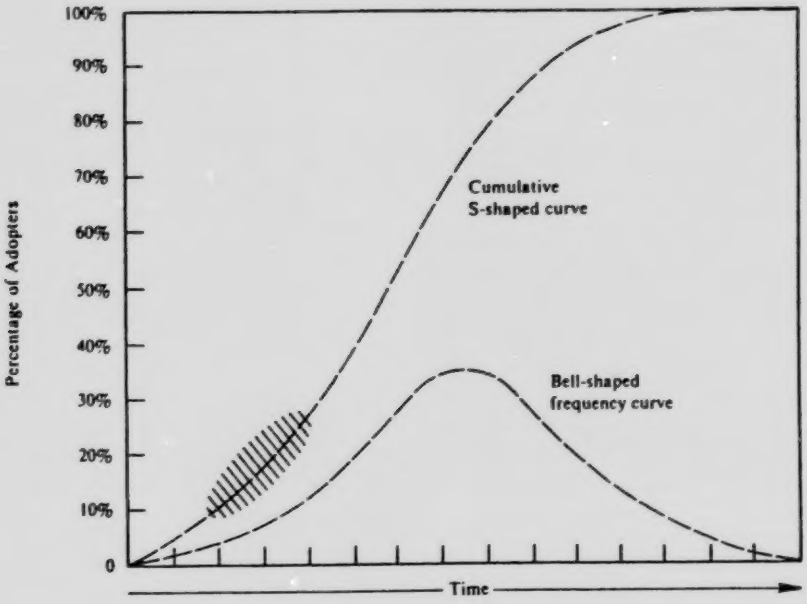
Our challenge then, is to set in motion a progression of many incremental changes that will add up to the fundamental change called sustainable development.

How do we know if we're making progress? The most obvious way is by taking an inventory of actual on-the-ground sustainable development success stories that have taken place in Canada to date. But, given that we're still early in the change process, relying only on such physical evidence can be disheartening and, as we shall see, misleading – for example, Environment Canada has only been able to identify 15 such success stories so far.

Another way to track progress is to use an array of well-developed social science tools such as public opinion surveys, media content analysis, stakeholder analysis, and surveys of decision-makers and opinion leaders. Using these tools to monitor progress in sustainable development reveals that significant change is indeed occurring at the perceptual, attitudinal and even behavioural levels.

But before we go further, we need a common framework for understanding how fundamental societal change works. Not only is such a model needed in order to know how to truly measure progress; it will also provide important insights into how and where we need to apply our resources to ensure that the incremental changes we set in motion indeed add up to fundamental change. Even a massive amount of incremental change doesn't necessarily add up to anything significant.

About a decade and a half ago, when I was at the federal Office of Energy Conservation, we looked for a framework that would help us better understand this change process and found a model called "Diffusion of Innovation Theory". It was developed by Everett Rogers in the United States in the 1960s. Rogers introduced the notion of an S-shaped adoption curve to describe how change occurs within society.



Rogers' Adoption of Innovation Curve

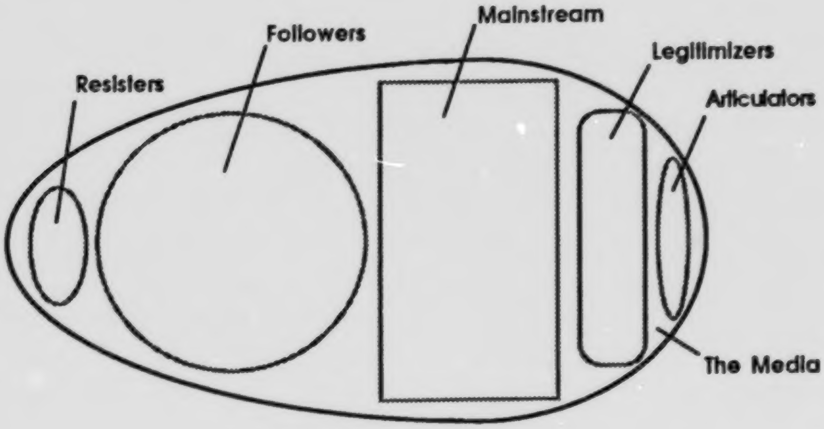
Rogers' S-curve gives the cumulative picture, while the companion bell-curve is the frequency curve. The model applies to any scale of change in any realm – societal, organizational, or single issue.

Adopters of a given change were then categorized by Rogers according to where they were positioned along the adoption curve. According to this model, change starts slowly, with the "Pioneers", the eccentrics who try on new patterns of behaviour first. The activities of these Pioneers are then legitimized by "Early Adopters", the first-on-their-block innovator types, and hence carried to the

"Early Majority" audience. This is the exponential curve section of the S-curve, where the particular innovation can get catapulted into the main stream of society, if its done right and the timing's right. (This is one of the few exponential curves that can actually work *for* us.) This Early Majority audience is then followed by the "Late Majority" and finally the "Laggard" category.

We have found Rogers' work, as well as other social marketing theory (that is, the marketing of new knowledge, attitudes and behaviour) very useful and effective in understanding the change process. It has aided us in designing intervention strategies and programs that successfully advance the adoption of a particular social change. Over the last 15 years, we have successfully applied this theory to market energy conservation, community crime prevention, non-smoking, better nutrition, drinking moderation, environmentally-friendly behaviour, and other positive change.
Building on these theoretical underpinnings (and over a decade of sometimes painful field experience), Synergistics has developed its own "Anatomy of Change" model.

The Anatomy of Change



The Public Environment

This model describes a change process moving from left to right. Like Rogers' model, it applies to any scale of change in any realm (that is societal, organizational, or single issue). The model has the following elements.

- The outer line in the shape of an egg represents the public environment, which is either supportive or resistant to the particular change in question. In this diagram, the fattest part of the egg is towards the right, representing a public environment that is supportive of the particular change. As we will see in the case of sustainable development, the public environment is so supportive that it resembles the shape of a polliwog rather than an egg.

- The areas defined within the egg represent clumps of "actors", paralleling Rogers' categories of adopters but cast more in an action mode. These segments of the egg can represent either segments of the general population or can be applied to specific sectors, for example industry. The size and dynamism of these segments affect, and are affected by, the public environment. This dynamic interplay represents the change process.

- The final element of the model is the space falling between the actor segments and the egg shell. This space is occupied by "The Media", which is the sum total of all lines of communications and interaction between sub-audiences in our society, including but not limited to what is normally referred to as the media – newspapers, television, etc.

Now let's apply this framework to the challenge of moving towards sustainable development in Canada. Specifically, I want to focus on two elements of the model — the public environment, and the corporate actors.

I said earlier that social science tools are available to both measure where we are now and to track progress over time. These tools include public opinion surveys, media content analysis, stakeholder analysis, and surveys of decision-makers and opinion leaders.

Let's first look at recent public opinion surveys to determine the present shape of the public environment related to sustainable development in Canada. This data comes from *The Environmental Monitor* which is a quarterly survey of 1500 adult Canadians focusing specifically on environmental and natural resource issues. (Begun in 1987, *The Monitor* is a joint venture of Synergistics and Environics Research Group Limited.) Here are some highlights:

1. The environment is at the top of Canadians' list of issues. In the Fall of 1988, one in four identified environmental protection as the area in which they would prefer increased tax spending, equal for the first time to Canadians' long-standing top issue, job creation.

2. The reason for this high level of concern is that the environment has now become a health issue to Canadians. Fully nine in ten Canadians believe that their health has already been affected by pollution and almost three in four believe that pollution is a major cause of cancer today.

3. The public expresses a strong willingness to pay extra for environmental protection. Over eight in ten are prepared to do so, more through higher prices than through higher taxes.

4. Canadians are so concerned about the presence of unsafe levels of hazardous chemicals in their immediate environment that one in two report taking steps to avoid this exposure, mainly through avoiding chemicals in their food (24%), avoiding hazardous products (15%), or through avoiding chemicals in their drinking water (12%).

5. Canadians have a conservation bias when it comes to land-use decisions. Six in ten believe conservation priorities should prevail over economic priorities in making such decisions. Only two in ten believe economic priorities should prevail. When asked which priorities prevail today in land-use decisions, eight in ten believe economic priorities are allowed to prevail.

6. Canadians clearly believe environmental and economic well-being go together. When asked what impact major spending on environmental protection would have on the Canadian economy, fully seven in ten say it would have a positive impact on the economy, with only one in ten believing it would have negative impacts. Hence, Canadians are intuitively already in agreement with the Brundtland World Commission Report.

7. Canadians see environmental protection as an economic driver in itself. Over eight in ten Canadians agree with the statement that the environmental protection industry in itself will contribute significantly to economic growth in Canada. Over two-thirds disagree with the statement that environmental protection will increase unemployment in Canada.

8. Sustainable development is seen as a major, achievable priority. While only 20% of Canadians have actually heard of the term "sustainable development", when told what it means, eight in ten believe that it should be a major priority for Canada and a surprising 90% believe that it is an achievable objective over the next decade.

As I said earlier, in the case of sustainable development, the Anatomy of Change model resembles more a polliwog than an egg. As a result, the pressures on public and private institutions in Canada to respond appropriately to this changed public environment are enormous. One can almost hear the creaking of the timbers from here.

While governments have important roles to play as well, I want to focus on the corporate players. Their role is particularly key, in my view, given the leadership role some of their members have already taken as articulators of the sustainable development message; and also because of the critical need for action.

(In my reading of public opinion, when there are growing fears and official inaction on an environmental issue, Canadians look to environmental groups to act in the public interest; when there is a recognized problem and the need for leadership, Canadians look to the federal government; but when there are identified solutions and the need for action, Canadians look to the private sector and themselves as consumers for follow-through. Clearly in the case of sustainable development, implementation of known solutions must form a large part of the next decade. Hence, private industry will need to play a major implementation role.)

To determine where key decision-makers in private industry stand on issues related to sustainable development, Synergistics recently conducted detailed telephone interviews with 50 presidents and vice-presidents, mainly in the renewable and non-renewable resource sectors in Canada. This was the first of a two-phase project conducted for the Corporate Planning Group of Environment Canada. The next phase will involve a quantitative survey of 150 CEOs in these sectors. (I want to thank Environment Canada for allowing me to use these early findings in this address.)

Here are our early insights into where sustainable development sits in the minds of corporate decision-makers in Canada.

- Not *one* of these corporate decision-makers we talked to, tried to pass off environment as a short-term issue. All felt it was a fundamental, long-term concern of Canadians that will leave lasting changes in their sector.

- A number of industry respondents seem defensive regarding their environmental practices, feeling they have done a poor job communicating with the public in the past on this issue. Also, many defined their role in environmental protection as simply one of responding responsibly to government regulations.

- Over 80% of those surveyed were aware of the term "sustainable development" (compared to only 20% of the general public). While definitions varied widely, all felt that it represented positive common ground with which they feel comfortable.

- To many, the fundamental nature of sustainable development was not understood, and the opportunities that it may represent for their corporation or sector were not explored. Less than 10% were actively pursuing opportunities.

- Some of the industrial sectors that appeared most receptive to sustainable development concepts were: agriculture, fisheries and other renewable resource sectors, packaging, consumer products, and environmental industries.

- A number of significant barriers to progress were identified by respondents. Limited financial resources were most often mentioned. Others included institutional barriers such as government regulations and industry practice, and perceptual barriers such as public misinformation and internal industry attitudes. A number identified the need for corporate cultural change before significant progress could be achieved.

- A reactive orientation far outweighed a proactive one. Very few respondents could identify any opportunities presented by sustainable development and most simply wanted to be told what to do through government regulations (thereby assuring a "level playing field" between at least domestic competitors).

- Most wanted both a carrot and a stick approach to be used by governments — that there was a need for financial incentives and tax mechanisms, as well as punitive legal action against those deserving it. Almost all wanted strong federal government leadership.

Clearly, corporate Canada has already been strongly affected by the changing public environment towards sustainable development, and are generally at least passively receptive to taking substantive action to adopt new practices. In fact, we were quite encouraged by these results and are looking forward to our continuing research with Canadian CEOs.

So there we have a snapshot of both the public environment and corporate attitudes on sustainable development today in Canada.

I'd now like to address the final question I set out to answer which was, "What are some of the next steps?". Let's go back to our Anatomy of Change model to gain some insights on this question. Let's apply it specifically to activating the private sector in Canada around sustainable development.

Here are the roles needed to be played:

1. **"Articulators"**. These are the leaders of the sustainable development concept, opinion leaders in different sectors and communicators of the message. They are the leading edge and obviously play a critical role. Functionally, their major task is to bring on the "Legitimizers", the early adopters who will see the market opportunities involved and will show how it can work.

2. **"Legitimizers"**, through their actions, words and most importantly market success create competitive pressure on "Mainstream" members of their sector to replicate the innovation. Loblaw Groceterias and their "Green" products are a good example of the kind of market innovators who usually play this role in the adoption process.

3. **"Mainstream"** audiences tend to be high-end companies operating in high-end markets — in other words class acts, often being major multi-national organizations. They are convinced that the right thing is also the successful thing to do by the Legitimizers and they quickly follow into the market place.

4. **"Followers"** are the "Me Too's" – they will follow any lead as long as it is proven to be successful and is being incorporated into industry practice or government regulations (preferably both). They tend to be more conservative, mid-range actors involved in mid- and low-end markets. Followers don't really warrant much attention by those promoting change.

5. Finally, **"Resistors"**, are those industry sectors or organizations who have either perceived or actual barriers standing in their way of adopting the particular innovation. Perceptional barriers usually far outweigh actual ones, however sometimes economic self-interest provides a powerful barrier (for example, the coal industry's approach to clean air legislation in the United States). Unlike Followers, Resistors often warrant some attention by those promoting change in order to at least remove the perceptual barriers of those key resistors who could seriously inhibit the change process.

Given all this, what are the next steps in promoting sustainable development in Canada?

1. **Solidifying the leadership.** In the past, leadership in sustainable development in Canada has mainly developed through the work of the Canadian Council of Resource and Environment Ministers' (CCREM's) Task Force on Environment / Economy. Now, provincial and national Roundtables are playing this vital role. No doubt, new institutional forms are required to ensure a non-governmental emphasis continues to be applied in the leadership group. Also sectoral and community level articulators are required in order to further the penetration of the messages. And finally, a significant level of funding and staffing resources will be necessary to advance progress.

2. **Mobilizing the innovators.** Generally speaking, sustainable development has a vibrant leadership and a good array of pioneers in Canada. What now is needed is a full set of legitimizers in key sectors and organizations — market and product innovators who will embody the concepts into tangible on-the-ground things that work. This requires face-to-face, peer-to-peer exchange, using pilot-scale projects and case studies to maximum effect. A good inventory of success stories and the successful transfer of enthusiasm and practical experience at this stage are essential.

3. **Building the infrastructure.** Both formal and informal infrastructure is required for a major change process to be successful. Clearly, the Winnipeg Centre for Sustainable Development is a needed initiative, as is adequate resourcing of secretariat functions within the provincial and national Roundtables. In addition to these, The Canadian Environment Industry Association can play a critical role in promoting the reality of this growth industry both at home and abroad, generating sales and profit for re-investment. Sectoral task forces should be established by major industry associations to address the specific needs of their sector (similar to the sectoral task forces used to promote energy efficiency a decade ago). And conferences such as this one are required to solidify and extend the network of professionals in Canada working towards sustainable development.

4. **Telling the story.** In order to build momentum as we approach the exponential portion of the S-curve, "legitimizers" need to talk to "mainstream" audiences through industry conferences and workshops as well as trade publications and the media. It is important to note that it should be the legitimizers, not the articulators, doing this communications. The articulators should concentrate on reaching the resistors where they feel progress can be made.

It is indeed an exciting time for those of us involved in the challenge of moving Canada towards sustainable development. It is clear from our research that both the public environment and corporate receptivity are ripe for a decade of progress during the 1990s.

Our challenge is to learn from past experience in marketing change to ensure that the incremental changes that we are each working on are indeed going to add up to a fundamental change in our society.

Continuing to monitoring progress within the framework of change that I have outlined here will no doubt be useful in evaluating progress and re-directing our efforts to ensure that we built an S-curve worthy of the challenge.

I'm convinced that we will succeed.

TITLE: Environmental Regulation and Sustainable Development
SESSION: B.3
BULLETIN NO.: 16

PETER PEARSE

Sustainable development represents an attempt to harmonize economic activity with the natural environment, said Dr. Peter Pearse. Implementation will rely on a mixture of market processes, prohibitions and regulatory arrangements.

Refining his view of the issue, Pearse noted that since Malthus to the Club of Rome, there has been many who have argued that economic growth was constrained by the limited amount of land. Yet these theories have been demonstrated to be wrong: populations have multiplied, but our economic production has grown even faster.

We have reduced our demands on natural resources by substituting capital and other inputs for them. On the supply side we can obtain the same product, at less cost, from lower grades of resources, thereby increasing our effective supply. The problem is not one of an impending scarcity of natural materials for production. It is a problem of environmental degradation.

Pearse states that society has created economic incentives which over-use environmental resources. Many of our natural resources like water, are not priced, so there is no incentive to conserve them, to use them efficiently or to avoid wasting them.

Pearse notes that the Canadian economy developed on the basis of its natural resources. As each came under increasing demand Canadians developed ways of balancing demand with the supply by employing market mechanisms.

It may now be time to consider harnessing the financial incentives of users by ensuring that they recognize the full value of the resources they use.

BOB PAGE

Governments can impact the implementation of sustainable development, in a leadership role, in the creation of incentives, and the creation of regulations. In its regulatory role, Mr. Page focused on a number of structural issues which undermine its effectiveness.

Noting that there is no department for sustainable development, jurisdictional "turf wars" could be expected to develop. Page went on to note that the principal exponents of sustainable development were resident in line departments while the main decision making power was centralized.

Page stated that the trend towards the use of regulations to implement sustainable development flowed against the mainstream of deregulation elsewhere in the government.

ROY AITKEN

Mr. Aitken stated that a mix of regulatory and incentive measures would be required to successfully implement sustainable development.

Aitken noted that the present body of environmental law has developed rapidly over the last two decades largely in response to some traumatic event. As a result regulations are applied in an unpredictable and inconsistent manner. There has also been an unhealthy emphasis on punitive legislation, he said.

Until recently, industry was absent from the environmental debate. But that is changing. In the last two decades there have been enormous changes in consumption patterns, downsizing, efficiency, conservation and recycling. New tools to achieve more efficient economy/environmental integration are being suggested: incentives to promote effective environmental protection by industry, tax credits and contaminant charge schemes to mention only a few. If industry is to implement sustainable development, then there must be real incentives to pursue the technical and economic innovations necessary to succeed.

DISCUSSION

. The incentives approaches would be financed largely out of general government revenues. The pricing approach would place the fiscal responsibility on the user.
. A round table format and interdepartmental mechanism could be utilized to implement sustainable development within the public sector rather than a sustainable development department.

HARMONIZING THE ECONOMY AND THE ENVIRONMENT: THE ROLE OF INCENTIVES IN THE SEARCH FOR SUSTAINABLE DEVELOPMENT

Peter H. Pearse

Faculty of Forestry, University of British Columbia
McMillan Building, 283-2357 Main Hall
Vancouver, British Columbia V6T 1W5

Introduction

Since the World Commission on Environment and Development reported in 1987, we have heard a great deal about "sustainable development."[1] The idea of sustainable development seems to appeal to almost everyone, because it implies support for both the advocates of environmental protection and the proponents of economic growth. Indeed, the Brundtland Commission, which popularized the concept, is explicit about this: economic growth and environmental protection are not only both desirable and possible, they go hand in hand, one complementing the other.

This is a striking contrast to the dark predictions of the Club of Rome a few years earlier. *The Limits to Growth* concluded in the early 1970's that if economic activity continued to expand the world would deplete its supplies of essential natural resources and food and suffocate in environmental degradation by the mid 1980's.[2] In fact, the opposite happened. World production expanded at an unprecedented rate and almost all natural resources products became *less* scarce, whether scarcity is measured by the quantity available or by price. So it was reassuring for the Brundtland Commission to inform us, retrospectively, that the Maltheusian predictions of the Club of Rome were wrong and what we achieved was actually possible.

The Brundtland Commission has served a valuable purpose in drawing public attention to the interdependence of the environment and the economy, and that we need to make some changes in order to harmonize the two. But its call for sustainable development leaves us with two fundamental questions. One is whether continuing economic growth coupled with continuing environmental improvement is indeed possible. The Commission asserts this possibility, but the theoretical underpinning of this argument is vague, and it is not supported by its evidence of environmental deterioration associated with economic growth.

More troublesome is the ambiguity about what sustainable development means in a policy sense. The Brundtland Commission tells us it means continuing economic growth without impairing the capacity of future generations to grow. But this tells us more about what we are to achieve than how to achieve it. If sustainable development is achievable, the challenge is to figure out what we must do, in an operational sense, to protect the natural environment and still enjoy increasing production sufficient to raise the standard of living of a growing world population.

We can usefully begin by identifying what we have been doing wrong up to now. As far as economic growth is concerned, we have been doing very well over the last two centuries or so, at least in the western world. And past generations do not seem to have impaired our ability to prosper and grow.

Natural Resource Limits to Growth

It is worth noting, also, that our economic growth does not seem to have been constrained by the limitations of natural resources. This is important, because ever since the Phisiocrats of eighteenth century France and the great Adam Smith reasoned that all wealth ultimately came from the land, the corollary, that the limited amount of land would limit growth in production, has been a strong theme in economic doctrine. The most famous exponent was Thomas Malthus, who argued that a growing population on a fixed land base would literally eat itself out of house and home. If people did not restrain their reproduction, populations would be held in check by war, pestilence and starvation. This theme recurs in the history of economic thinking through the Victorian period, the Conservation movement and recently the Club of Rome.

Thankfully, this theory is demonstrably wrong. Since Malthus wrote, populations have multiplied, but our economic production has grown even faster. As a result, standards of living have improved immensely. In particular, our limited natural endowment of land and natural resources has not prevented us from ever-increasing production.

All this traditional theory about limited land and resources limiting growth led to the wrong conclusion because it failed to take account of advances in science and technology that have progressively reduced our dependence on natural resources. We reduce our *demands* on natural resources by substituting capital and other inputs for them; so today, for example, we need much less land than Victorian farmers used to produce the same amount of food. And the goods we produce today contain much less natural raw material than they did in an earlier era.

We have also been able to steadily increase the *supply* of the raw materials we need for production. Victorian copper mines needed ore of five percent, while we can obtain the same product, at less cost, from ore of one-tenth of that concentration, which has vastly increased the supply. Moreover, we no longer need copper wire to transmit electricity and messages because we have learned to use other, more plentiful materials.

Trends over the last century indicate that the supply of most primary natural resource materials has increased faster than the demand, with the result that their real prices have declined. Even though their output and consumption has increased enormously, they have become less scarce over time.

These trends deserve emphasis because Malthusian ideas are deeply entrenched in our perceptions of man and nature. They tend to confuse our understanding of the sustainable development problem. Our problem is not impending scarcity of natural resource materials for production. It is a problem of deteriorating environment. So even if economic growth in the conventional sense continues, the quality of life may not, and it may actually decline. And ultimately, environmental degradation may undermine the natural processes that sustain the resource base.

Causes of Environmental Degradation

To find ways of preventing environmental degradation it is helpful to consider why it now happens. The causes are complicated, but one fundamental cause is that we have created economic incentives to over-use environmental resources. Unlike most of the raw materials used in production, many of our so-called environmental resources are not priced, so there is no incentive to economize on them, to use them efficiently or even to avoid wasting them.

For example, if water is provided to farmers and industries and households at zero price, users cannot be expected to recognize the value of the resource, the cost of supplying it, or the cost of disposing of it safely after it is used. Water is regarded as a free good, and users, lacking any financial incentive to economize, tend to use it wastefully.[3] The same is true of the capacity of water to assimilate wastes; if it is free it will be used wastefully, and excessively as demands grow, leading to our pollution problems.

It is no coincidence that the environmental resources that are suffering most from our economic are those that we exclude from market pricing and rationing. So, wherever the demands are heavy, we find waste and degradation of water, the quality of water, wildlife, sport fisheries and even ozone. In the absence of incentives to conserve and protect them, we have invoked governmental controls and regulations to prevent abuse, but these are inevitably arbitrary, inflexible and therefore costly, and often unsuccessful.

It should be noted that these resources are excluded from market allocation processes because we have chosen to exclude them. It is quite possible to allow market forces to price and ration rights to them, as examples in Canada and elsewhere demonstrate, but we have generally been reluctant to pursue this as a means of harmonizing the economy and the environment.

The line we now draw between resources subject to market processes and those excluded is largely a result of history. Over the last two centuries as the Canadian economy developed, one natural resource after another has become valuable: fur-bearing animals, agricultural land, minerals, timber, water and fish. As each came under increasing demand, we developed ways of allocating it among users, assigning rights to use it, and bringing it within the ambit of the market mechanisms for balancing demand with the supply. But this evolutionary process has not kept pace with the new pressures on resources that have become scarce only recently.

This general point is illustrated by the recent recognition of this "market failure" in commercial fisheries, and encouraging efforts to deal with it. Some of the world's leading fishing nations have recognized the "tragedy of the commons"; free-for-all fishing leads to resource depletion and economic waste, and attempts to control it by restrictive regulation leads to costly inefficiencies. But if, instead, we specify the catch that the stocks can sustain, and assign well-defined rights to it, fishermen will sort out the most efficient way to harvest it and begin to take an interest in managing the resources as well. The same can be done to overcome abuses of water, air and other environmental resources that currently lack the protection of the market system.

This is, undoubtedly, a politically sensitive subject. At the risk of oversimplification it can be said that environmental advocacy groups tend to distrust market processes because they hold these very processes responsible for environmental abuses. Accordingly, they support interventionist measures to restrain and regulate economic behavior in the face of incentives to abuse the environment. Market processes are seen as the cause of the problem, and so are rejected as a solution. On the other hand, advocates of the market system often criticize governmental restrictions as impediments to growth, emphasizing further the apparent conflict of objectives.

However, in the interests of objective analysis of our problem, we should try to set aside these partisan biases. Nations that embrace the market system certainly have no monopoly on environmental abuse. The issue here is whether, having chosen the market system to drive most of our economic behavior, we have stacked the deck against certain environmental resources by isolating them from incentives to economize on their use.

This argument is consistent with the principles of "user pay" and "polluter pay" that have become popular in recent years. But the popularity of these notions seems to reflect a desire to force users to bear the cost, failing to recognize that in a market economy higher costs of production are largely shifted onto others. The real benefit of requiring producers to incur full costs is in changing their behavior, to conform to the value and limited supply of all the resources they use.

Concluding Comment

Canadians generally want to take advantage of the potential economic benefits of water resources while at the same time preserving the health of the natural environment. Notwithstanding assurances to the contrary, compromises between these goals will have to be made. But we have little choice other than to pursue both. The task is to design management systems that will minimize conflicts.

Our quest for sustainable development forces us to search for better ways to harmonize economic activity with the natural environment. There is no simple solution: we will probably need a complicated mixture of market processes, prohibitions and regulatory arrangements. But we should begin by taking a hard look at the artificial line we have drawn between economic and environmental resources. Some resources that we have traditionally regarded as surplus to our needs have become scarce and valuable, and we are over-using them. If we are going to reconcile our demands with the capacities of the natural environment we will need some demand management. And our historical experience tells us that our efforts will be most effective if we harness the financial incentives of users by ensuring that they recognize the full value of the resources they use.

Footnotes

[1] World Commission on Environment and Development (Brundtland Commission). 1987. *Our Common Future.* United Nations. New York.

[2] Meadows, D.H., D.L. Meadows, J. Randers and W. Behrens. 1972. *The Limits to Growth.* Universe Books. New York.

[3] Pearse, P.H., F. Bertrand and J.W. MacLaren. 1985. *Currents of Change.* Final Report of the Inquiry on Federal Water Policy. Environment Canada. Ottawa. 186 pp. + Appxs.

ENVIRONMENTAL REGULATION AND ECONOMIC INCENTIVES

Roy Aitken

Executive Vice President, International Nickel Company
P. O. Box 44, Royal Trust Tower
Toronto Dominion Centre
Toronto, Ontario. M5K 1N4

ABSTRACT

The paper makes it clear that the problems which the world faces in attempting to change national policies, technologies and individual lifestyles are enormously complex. The solutions will be equally complex and there will be no one answer. Until recently the environmental debate has been characterized by adversarial attitudes between environmental groups and business. Legislation and regulation essentially have been the only levers for change. The development of regulation largely in response to traumatic events has not resulted in a coherent or comprehensive legislation and regulatory scheme. Enforcement and punitive legislation have been paramount.

The Brundtland Commission has established a different option, one which calls for a new era of economic growth based on policies that sustain and expand the environmental resources base. This attacks the adversarial nature of the debate because everyone has to be involved. Canada's national task force developed the message and made a variety of recommendations, many of which dealt with the development of incentives in one form or another. Public opinion polls regularly give governments the go ahead to use fiscal policy.

Finally, the paper explores some tax incentive options.

I believe it is my role on this panel to promote the concept that economic incentives are required to hasten the day when sustainable development will become a reality. I welcome this opportunity and will attempt to do just that.

However, before starting into that thesis, let me make it clear that I do not believe that we are looking at an "either/or" situation. In terms of regulations and incentives, the problems which the world faces in attempting to have the nations of the world, the industries of the world and the citizens of the world change the policies, technologies and lifestyles which have developed particularly over the last two centuries, since the industrial revolution really got underway, are enormously complex. The solutions to the problems will be equally complex and it would be naive to think that there is one simple answer, which will provide the necessary motivation for change. That motivation will be brought about by an equally complex mix of solutions.

The mix will certainly include regulations, but will also include pressures arising from greater understanding of ecological and health impacts, consumer pressures, changing market demands and changes in technology to satisfy those demands, growing awareness of societal needs and ecological limits, internally and externally generated pressures to behave as good citizens, the need for the developed world to set examples for and to aid developing world projects. And underlying many of these is the need for business to remain competitive and to continue to demonstrate good bottom line performance. In respect to that last factor, it is here that the availability of appropriate incentives to make changes will demand attention from business. Once business has this sort of motivation, healthy self-interest will result in its making changes faster than any other organization will ever achieve. It is a simple fact, that once business starts to spend money on itself, it wants to do it as fast as possible so that it can get the benefits as fast as it can. That may not be peculiar to business, that is just good, healthy, self-interested human nature showing through.

Turning to regulation, there is without doubt a place for it in all of our lives. One need only look at the latest ecological disaster, the Exxon Valdez, to see the need. That is a horror story, but there are many others which fit in the same category, and I am fully supportive of the types of regulations, albeit blunt instruments, which will ensure that proper care and attention is taken by all of us, whether as individuals or collectively in a business or national environment to preserve the all too fragile ecology.

But we certainly have our fair share of regulations already in place. Over the last 15 to 20 years there have been significant developments in the area of environmental law, developments which must be of concern to all industry. What began as one or two pieces of legislation, has become a discrete and complex legal speciality. There has been a discernable evolution in the nature of the legislation that has been enacted. Early laws in the 1960's and 1970's were intended mainly to license pollution sources and authorize some forms of remedial action. In the intervening years, laws have become much more intrusive, leaving few activities unaffected and fewer people unaccountable for environmental damage. Unfortunately, these laws have not been founded on comprehensive policy development, rather, they tend to appear in response to public outcry related to some traumatic event. Accordingly, there is not a coherent or comprehensive legislative and regulatory scheme. What has developed is a convoluted maze of legislation, regulation, policy and guidelines, much of which is difficult to understand even to the legal expert. And some of the acts and regulations overlap and are applied in a manner which is neither predictable nor consistent. This situation presents those active in areas which may impact on the environment with a nearly impossible task as they attempt to steer their way through the legal responsibilities imposed on them by the legislation.

Concurrently with these developments, we have seen a growing and somewhat unhealthy emphasis on punitive legislation. That may be a natural outgrowth of the adversarial relationships which existed between environmentalist groups and business groups in the past. Happily, I believe that we are moving beyond this point to a stage where common interests are surfacing. And, industry is beginning to see that in its own self-interest, it must make changes. This swing in attitudes is coming about because of better understanding and knowledge of the impacts of various activities upon the ecology and increased ability to respond to these impacts. It is these factors that will result in the degree of change which is required.

Until recently, regulation and legislation have been essentially the only game in town, and we have seen, over the years, an apparently irreversible change in legislative patterns towards more and more stringent forms of punishment. In recent years, the most intensive activity in environmental regulation has taken place in the area of enforcement. The Ontario provincial government, for example, has dedicated funds and increased the number of people involved in this activity. Fines have been substantially increased and jail terms for individuals imposed. There is increased concentration on the role of the individual and we can expect this to increase.

The Supreme Court of Canada has determined that pollution offences are public welfare offences. Accordingly, it is not necessary to demonstrate intention or recklessness in the breach of the Environmental Protection Act before a conviction can be registered under Ontario's legislation. Many offences now are strict liability offences, under which a company or individual is liable for the conviction unless it can show due diligence in avoiding a breach. For an offence of absolute liability, proof of the breach alone is sufficient to register a conviction irrespective of intent or due diligence. Clearly, this is the sort of legislation which makes democratic philosophers and liberal-thinking legal minds struggle. Do we really think that these moves are healthy and encouraging? They will certainly create great business for the legal profession, but will they really result in a move towards sustainable development, or will they generate resistance and inevitably, as a consequence, a slowing in progress. There are many who will contend that punitive fines and jail terms have historically failed as attitude modifiers, and yet, that is what we really need.

In many ways, this regulatory evolution has been an inevitable development, largely because environmental activist groups do not in themselves have the power to make change happen. But they do have the power, and have used it very effectively, to raise the public profile of the issues, to educate people and to build pressure on politicians. Politicians also cannot directly make change themselves. Their stock in trade is regulation and legislation, and they have been moving fast. Industry which can and must make changes has largely been a passive observer of this situation. In that respect, it has got what it deserved by not recognizing the developing situation fast enough and by failing to provide properly articulated options for the legislators consideration.

For many years, industry was essentially locked out of the environmental debate and quite happy not to be a part of it as we went through the era of the club of Rome -- limits of growth -- world running out of resources and a whole range of shutdown scenarios flowing from this philosophy. Industry did not believe in that and still does not, because it is not necessary for the world to run out of resources. In the past two decades, we have seen enormous changes in terms of consumption patterns, downsizing, more efficient use of materials and resources, conservation and recycling which is still in its infancy. Substitution which has been going on since the stone age will continue and the oceans are virtually untouched. Within the life span of this planet, which after all is finite, there is no reason to believe that resources will be exhausted.

The Brundtland Commission in its landmark report, "Our Common Future", gave the world a different option, one which identified poverty as the villain of the peace and called for a new era of economic growth, based on policies that sustain and expand the environmental resource base, with such growth being absolutely essential to alleviate the poverty that is deepening in much of the developing world. That was a call to which industry can respond, because it understands and believes in growth.

Canada's National Task Force took that message a step further and called among other things for governments to develop new tools to achieve more efficient and effective environment/economy integration; economic mechanisms including contaminant charge schemes; tradeable discharge rights; investment tax credits; reduced interest bonds; economic incentives to promote effective environmental protection by business; systems for measuring the contribution of the environment to the national economy and national wealth; more research; specific projects demonstrating environment/economy integration. There were many specific recommendations for government and industry for ongoing activities, for education and for a total national involvement.

In the final analysis, for major changes in environmental control to occur, industry must act. With the addition of effective incentives to the armory, we can expect to bring about the sort of change which can take industry beyond the minimum standards established by a regulation. That is the nature of any regulation, to set a minimum standard. But if there is a real incentive, then industry will go as far as is technically and economically feasible.

The concept of incentives to industry to make changes may be distasteful to some people. It runs counter to the "polluter pays" slogan. But that is an old-fashioned slogan for environmental dinosaurs. It fails to recognize that we are all polluters. People should recognize that there is no organization existing which moves faster than properly motivated industry and the thing which motivates industry best is an impact upon its bottom line. Surely that is something which all of us would like to see. And if its works, then use it. Surely no one believes that force feeding is more effective than willing absorption.

Now, how do we bring about this position where incentives can provide a balance for regulations, and the pressure which we need, for change. We know that deficits are high and that governments do not have money to throw around. Yet, the Canadian public, in poll after poll, says that as well as being concerned with the state of the environment, it is prepared to pay something towards putting it right. And let's be straight about that one, the Canadian public ought to pay something towards it because every one of us, every citizen is a polluter in his or her own little way; whether it is putting gas into the automobile tank, turning up the thermostat on a cold day, having a cold beer out of a can (even a recyclable one), we all contribute to the pollution load and we are all going to pay one way or another, most probably through the tax system. The polls give governments a mandate to use fiscal policy to encourage environmental clean-up. They should exercise it.

For example, provisions already exist for industry to accelerate write-offs on projects approved by Environment Canada up to 50 percent of cost when the project goes into operation. What is magic about 50 percent and what is magic about waiting until it goes into operation? Why not 100 percent as spent? It would cost the treasury something, but that would be an effective incentive. What about R&D? IRDP provides government assistance to approved research and development projects, normally up to as much as 40 percent of the cost. Every analysis that I have seen on R&D

expenditures says that we in Canada do not spend enough, that we run far behind the Japanese, the Americans and most of the Europeans and that we need to spend more. Why not focus this on R&D for environment clean-up activities where undoubtedly new technology will help. Why not double the 40 percent for environmental projects only.

These are just a couple of ideas and a good tax lawyer with a blank sheet of paper could quickly fill it with others. The exploration industry in this country, for example, was revitalized by the introduction of flow through shares a few years ago. That program has resulted in a major expansion in the gold mining industry in Canada. It was a successful and original use of fiscal policy. It may not fit entirely for the environment, but there will be other options.

Industry will react to this type of signal from government. Also, and quite apart from the absolute dollars, the signal from government associated with an incentive type approach will be very significant, not just industry, but nationally, and internationally, governments will benefit from that.

In this respect, finally, I am very pleased to see the appointment of Michael Wilson to the National Round Table on the Environment and the Economy, a very important signal. I don't for one moment believe that the Minister of Finance is going to participate on that Round Table simply to tell us that money is tight. I look forward to hearing from him how we can find money to do what needs to be done.

TITLE: Public Participation
SESSION: B.4
BULLETIN NO.: 17

DR. LESLIE WHITBY

Consultation is now a way of life at Environment Canada said Dr. Whitby. It has led to successful products, such as the Canadian Environmental Protection Act and the creation of a network of environmental groups.

The three critical aspects of public consultation are: the result or product; the process; and, the human element, i.e. respect for others views and cultural values. "There has to be time for participants to get to know each other and to develop mutual respect," said Whitby. The key to success is getting off to a good start by clearly identifying the needs of all stakeholders, she said.

Other important considerations include managing relationships and allowing yourself to succeed. "Recognize that consultation won't solve all conflicts, but will help in finding common ground," said Whitby. Consultation and the public process involves staying power, relationship building, strategic reaction, learning experience, and bridging cultural gaps.

Communications must be a two-way street, both sides must listen, hear and understand each other. For effective public communications, Whitby said, involve the media early in the process.

RICK COOKE

Sustainable development will only be achieved by taking unpopular decisions said Rick Cooke. He used as an example, the siting process employed for Manitoba's Hazardous Waste Disposal facility.

Proponents will have to develop new mechanisms to ensure unpopular projects receive public endorsement. "Public participation in the decision-making process requires a deliberate notion of a co-management process," said Cooke. The preferred outcome is for the proponent and community to jointly choose the site.

Avoid selling projects on the basis of job creation. People are more interested in potential risks to the community. "Technological considerations are not absolute," said Cooke. "There must be a consensus among the proponents and the community."

CHARLES FERGUSON

"Public participation is a right," said Charles Ferguson. "There exists a more open process to project planning and implementation."

Canada's Task Force on the Environment and the Economy has established goals and policies for implementation. Industry too must develop environmentally sensitive policies and include public consultation in the early stages of project development. "Companies should provide an annual review of environmental impact, audits, and assessments," said Ferguson.

Further research in environmental assessment procedures should be fostered, he said. "With industry more positive to the assessment process, we can focus on public, economic, and social needs," said Ferguson.

JACK DUBOIS

Jack Dubois said the public has a right to be informed. Their input must be incorporated into the decision-making process, if not, there will be cynicism and conflict. Six guiding principles are: openness, fairness, mutual respect, consideration of cultural and world view differences, commitment, and, flexibility.

"Critical aspects to consultation include: timing, scope of the issues, availability of resources for participants, degree of information sharing, design of decision making process, word must match deed, and evaluation," he said.

The criteria for final evaluation must determine the impact on: individuals, social justice, other nations, future generations, and the environment.

ISSUES RAISED FROM THE FLOOR

. Do not wait on government to invite public participation. Anyone can begin the process.
. In order to encourage participation, you must be pro-active.
. Use any available means of communication, i.e. direct mail, radio public service announcements, etc.
. Complaint that despite new federal and provincial legislation, processes have not been improved and are still out of date.

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CONSULTATION: PRODUCT, PROCESS AND HUMAN VALUES

Leslie M.A. Whitby, Ph.D.

Sustainable Development Branch, Canadian Wildlife Service
Environment Canada
10th Floor-351 St. Joseph Blvd. Place Vincent Massey
Ottawa, Ontario K1A 0H3

Consultation is a tool used extensively in Environment Canada. We would not have achieved the agreements we do have today on controlling acid rain or toxic chemicals without good consultation processes. Implementing Sustainable Development will require greater efforts at consultation.

It's a way of life in Environment Canada but it was not always a good life. Five years ago, we and our major interest groups or stakeholders sat down to define good consultation mechanisms. The principles and protocols we developed then allowed us to succeed in some very difficult areas.

The Canadian Environmental Protection Act, State of the Environment Reporting, and the National Task Force on Environment and Economy all used the same approach rather successfully.

We built a network of dedicated professionals from all works of life, who respected and trusted each other and gave their personal and professional lives to making substantial contributions to Canadian life, and the Canadian environment. Last year, we perceived the need to expand the network into the groups who would be the next generation to make things happen. We held five workshops across Canada to share the keys to success and build that network. At the same time, we took the opportunity to reassess and improve our approaches to consultation. What I will outline today are the learnings from both the workshops and our re-evaluation.

I would like to stress that there are three things that are critical to the success of any consultation.

* Result or product	- the reason we undertake the consultation
* Process	- bad processes have stopped many an effort and left many reports sitting on shelves.
* Human Values	- Fundamental essence that shapes cultural differences. - trusting each other and building commitment to implementation.

It is the Process and Human Values points I am going to stress, recognizing that good process, and understanding and respecting our human natures, will yield good products with a commitment to implement.

The Participation Era

* We live in the "participation" era. There is considerable growth in participation activities. Participation sports. Participatory management interest groups. Group activities. "Participation".

* The public is increasingly well-educated; systems that rely on ignorance are no longer effective. "Public participation" is a way organizations can enhance their decision making and capitalize on this increased knowledge and understanding.

* We live in an era increasingly dominated by information. "Public participation" is a technology that can be used by organizations and their leaders to share, manage and use information.

* In our society, many have reached a stage where basic needs (food, shelter, etc.) are assured. Public participation can channel their creative energies through community involvement, group problem-solving and the enhancement of our quality of life.

* We consult because no one has cornered the market on ideas or solutions.

Definitions

Meaningful consultation is an ongoing dialogue among affected stakeholders aimed at obtaining all the relevant information, evaluating the available options and their related consequences, and providing an objectively balanced perspective to each stakeholder's decision making.

Meaningful consultation is not a simple matter of bringing a diverse group of interested parties together and expecting them to immediately and automatically develop solutions to complex issues. There has to be time for the participants to get to know each other, to listen and understand respective positions, and to develop respect which can grow into trust in that particular environment. Finding the common ground of consensus and building on that commonalty to reach a solution requires time.

It can be demonstrated that programs, for which appropriate time was not allowed in the developmental stage to seek consensus and test solutions, have suffered inordinately in the implementation stage. The time spent on a project in the developmental stage will reduce the time, costs, hassles, delays and disagreements at the implementation stages.

Good consultation relationships built up over time also support more rapid and effective cooperative responses to urgent situations such as environmental accidents.

The right kind of consultation can help ensure that the issues are appropriately defined, that constructive conflict-resolution techniques are adopted, and that solutions are developed which are relevant to the interests of all stakeholders.

Spectrum of Activities

The processes of public participation run from open houses, technical briefing, public hearings, workshops to multi-stakeholder consultations.

There is the need to "call it what it is". Simple logic, but it was reported time and again that significant difficulties were caused in the process by inviting people to take part in a process and when they arrived they found "something else". "You asked me to share my views (we would like to consult with you) but you only provided for an announcement by your organization and no opportunity was given to me to talk".

Encourage stakeholders to feel an 'ownership' of the process.

Communicating Clearly

* Listen, hear, understand.

* Encourage two-way communications: be fair, be open.

* Identify a mutually acceptable database.

* Involve news media from the beginning; they need accurate information.

* Develop a plan for public input (information/discussion/consultation).

* Exchange knowledge and information with key stakeholders.

* Carefully choose words in all communications.

* Avoid jargon.

Culture

"Culture is not a quaint thing. It is something that allows us to survive in the circumstances in which we find ourselves."

Culture is a significant socialization process. Cultural values are learned and we always learn them as part of a group. Our cultures establish in our own minds a shape and understanding of our world. If we can understand our own cultural frameworks, communities & biases, we can enhance our communications.

All of us are members/participants in a number of cultures that affect our understanding frameworks.

* Our ethnic culture

* Our age culture (youth/teen/senior)

* Our working culture (government/industry/voluntary/labour)

* Our educational/training culture (accounting/social work/engineering)

How do we get beyond the perceptual limitations created by our cultural frameworks?

* Let people talk to you about how you see things - come to understand your own frameworks well.

It is obvious that the skills to manage in these different processes change. In assigning personnel to these processes, it might be helpful to asses the skills potential participants (and managers of public participation processes) have in dealing with these dynamics. Good recruiting of participants should take this into account.

Because public participation involves feeling as well as thinking, a participant's comfort level with emotional content should be considered. The emotional involvement in different types of processes changes dramatically. An information session is a more relaxed venue than a multi stakeholder consultation on a high conflict issue. Good managers are skilled and comfortable with this.

Keys to Success

Getting Off to a Good Start

* Clearly identify stakeholders and their concerns.

* Commit your organization to process before going public.

* Assure, in advance, a clear understanding of guidelines, procedures, rules and the consequences of events and regulations surrounding the project, process or policy at hand.

Managing the Process

* Appreciate and understand the different stakeholder groups as different cultures with their own myths, values, history and symbols.

* Understand that public participation is a process of bridging the gaps created by different cultures.

* Plan.

* Develop feedback processes that allow you to know what stakeholder reactions are.

* Adjust target dates and deadlines to stakeholder realities.

* Involve the public and stakeholders in setting guidelines and parameters.

* Learn to listen patiently, while you control your own frameworks let other people's views in.

* Discuss the different views and develop a common view.

Managing Relationships

Few of us think of our day-to-day relationships with others as a source of management or leadership learning. But, if public participation is an act of relationship building and managing, we may well make use of skills learned from other sorts of relationships:

* Be open about both the positive and negative aspects of a situation.

* Be consistent and clear.

* Recognize that it's acceptable to have differences.

* Accept that everyone has something to contribute.

* Listen, hear and understand.

* Strike a balance between thinking and feeling - express both.

* Remember that, while public participation is a cooperative process, partners in any project are also individuals with their own feelings and ideas.

* Maintain enough contact so that members of the relationship feel involved.

* Share the shaping of the relationship.

Allowing Yourself to Succeed

* Determine 'success' - define it.

* Recognize that consultation will not necessarily resolve all conflicts.

* Solicit options then work towards solutions.

* Share Responsibility.

* Simplify the process: set clear terms of reference, objectives, procedures, time frames, and roles.

* Be flexible with the process.

* Be satisfied with something less than consensus in many processes.

Reflections

The following reflections on public participation come from experienced public participation planners, managers and participants; they point to some of the larger considerations that must be met on the road to success.

Public Participation Is...

An act of sharing power

Decision-making is the exercise of power. Leaders decide. Zero sum or synergistic. Power is many things - information, skills, credibility, status, organization.

* are organization representatives comfortable with sharing power?

* what represents power in this process?

* will we share power over process design as well as content?

An act of relationship building

The ability to build and maintain a relationship is emerging as one of the most effective power bases for leaders.

* do potential participants enjoy relationship building?

* are they good at it?

* often informal activities contribute as much as formal activities. Are participants prepared to take part?

A strategic action

taken by leaders to help their organizations adjust to external realities

* are potential participants prepared to look ahead?

* are people prepared to work for the good of all?

* can the shift be made from 'my' problem to 'our' problem?

A leadership act

Leadership is the ability to turn intention into reality and sustain it.

* is someone ready to lead the way?

- who has the vision?
- does someone have the ability to pull the group together?

A self-revealing act

One reveals one's values and cultural bias, your ability to do more, or not to be able to do something.

- are the participants clear about their values, attitudes and skills?
- will they willingly reveal these through public participation?
- are the values/attitudes etc. of the organization well known to all members?

A learning experience

- are we, as an organization and as individuals, prepared to learn and adjust?
- do we learn from feedback? Do we look for feedback?

An act of bridging cultural gaps

- are participants aware of their own cultural biases?
- are participants ready for a different view of the world?
- are participants skilled in bridging these differences?

An opportunity

- can participants appreciate how other contributions will enhance the process?

A CO-MANAGEMENT APPROACH TO DEVELOPING ENVIRONMENTALLY SENSITIVE PROJECTS

R. J. Cooke and A. B. Richards

Manitoba Hazardous Waste Management Corporation
#226-530 Century Street
Winnipeg, Manitoba R3H 0Y4

Introduction

The basic logic and necessity, of having to fully account for the effects that our economic development activities have on the environment is now gaining at least intellectual acceptance. Ensuring that our present and future development activities can be accommodated by the global environment in the long term is becoming recognized as necessary for our continued well being, both socially and economically. Following the publication of the Brundtland commission report (1) and, in Canada, the subsequent National Task Force Report (2), the ethic of sustainable development is being embraced by politicians, bureaucrats, the media and the business community alike. The global scope of the concept is being understood as is the need to involve the public at large in its pursuit.

Attention is now turning from the conceptual aspects of sustainable development to consideration of how the concept can be practically implemented. Many of our present and future economic development activities will demand controversial and unpopular decisions in order to ensure that they meet the test of sustainability. To address this, proponents of such developments must look to modifying and extending their approach to involving the public in such undertakings if society is to actually practice the concept. In this paper, the development of a hazardous waste management system in Manitoba is described and discussed in this context.

On one hand the development of such a system and the physical facilities involved in it represents a fundamental piece of the service infrastructure necessary for sustainable industrial development. We have come to recognize that our environment can no longer absorb the random and uncontrolled release of discarded hazardous materials. While much can be done to minimize the production and use of such materials through management at their source, recycling and replacement, society will continue to be faced with managing significant and likely increasing volumes of hazardous waste from past, present and future economic development undertakings. The necessity then exists for facilities to collect, store, analyze, treat and ultimately dispose of them in a manner that protects the general environment in perpetuity.

On the other hand, the development of such facilities constitutes a form of economic development itself that inherently involves the real or perceived assumption of risk, reduced quality of life and environmental impact by a minority for the greater benefit of the majority. Historically, this has been difficult to do and is popularly characterized as the "Not In My Backyard" or NIMBY syndrome (3).

A survey of U.S. experience (4) between 1980 and 1986 indicated that of 81 applications for treatment and disposal facilities in twenty eight states, thirteen were permitted and only six were developed. Typically, between five and ten years was involved in these attempts. In Canada, at least five attempts involving relatively small transfer stations through to fully integrated treatment facilities in four provinces were discontinued or suspended indefinitely during 1988 alone. Only one major facility has been successfully sited in the last five years (5) in this country. In virtually all these cases, the principal cause of failure or at best extensive delay was their lack of acceptance by the local communities.

Based on this experience, a proponent, public or private, of this type of development can draw two basic conclusions. The first is that it is a very risky undertaking that traditionally has had a low probability of getting off the ground. The second is that, if one is going to attempt it, new ways of presenting it to the public are required. In the following the approach adopted and resulting experience to date for such a development in Manitoba is discussed.

Background to the Manitoba Experience

In Manitoba, the process of developing a hazardous waste management system began in 1981 with the adoption of a long term program sponsored by the Provincial Government. Its first phase into 1987. It was directed at defining the issue, the options available to address it and most significantly to creating public awareness about the issue. A very extensive public debate, based on the best information available, was stimulated through the efforts of the Department of Environment and the Clean Environment Commission, and has been well documented (6,7,8).

The basic conclusions of this phase, arrived at through this process of public dialogue, were that:

- the Province required a hazardous waste management system,
- the system required a regulated rather than regulatory proponent,
- a public preference existed for the proponent to, at least in part, be a public corporation, and
- the subsequent development phases should be continued with a high degree of public involvement.

As a result, a commercial Crown corporation was established and began operation in mid 1987. The first task undertaken by the Corporation was to establish a basic strategic plan for the development. It is based on placing an emphasis on source based waste management from the outset and the incremental development of the collection, storage, treatment and disposal infrastructure as these can be justified (9). The plan has been pursued since that time with the development of a source based technical services capability, the provision of commercial waste management services, operation of small scale storage facilities, detailed market evaluation studies and initial engineering design of system facilities.

However, it was recognized that continuity of the productive dialogue with the public, as established by the provincial regulatory authorities, had to be maintained by the system proponent. In particular the task of facility siting and the approach taken to it had to be addressed from the outset in this dialogue.

Facility Siting Process

As noted above, the traditional approach to siting hazardous waste facilities has been generally unsuccessful. This approach has involved the proponent working largely in isolation to determine a location. Typically, economic and technical considerations have dominated siting decisions although in recent years environmental and socio-economic impact assessment work has been introduced as well. Consultation with public policy makers, elected officials and regulators is common but without a great deal of public exposure. Public information programs are usually undertaken relatively late in the process and often as preparation for the formal regulatory approval request. In effect, the public becomes involved at a stage when most of the decisions have been made.

Recognition that traditional project development methods have been prone to failure has led proponents of hazardous waste facilities to seek other methods of siting. For purposes of illustration the range of thinking can be characterized by two extremes. One is the "Who will take it" and the other is the "Best Site" approach.

In the former, the proponent looks for a place where people need development or are inherently insensitive to its implications and can be expected to present little opposition. In effect, technical, economic and potentially environmental factors are sacrificed for ease of public acceptance. The latter extreme emphasizes environmental and technical factors as paramount, potentially compromising economic viability and often at the expense of public acceptance. The view taken is that the least environmental impact can not be achieved if the more subjective biases imposed by the public are included. In effect, it is assumed that scientific and technical excellence will overcome emotion.

Identification of these two theoretical extremes and the risks associated with them, led the Corporation to look for some middle ground between them. On one hand, the approach must preserve the environmental, technical and economic integrity of the project but at the same time be capable of achieving a positive public consensus at a local level. The approach selected is documented in detail elsewhere (4) and is summarized as follows.

The siting process proposed and being applied has three basic sequential phases as summarized in Figure 1. The first involves the design of the process, extensive consultation on it with stakeholder groups, and the development and initial application of proposed environmental/technical siting criteria. The products or objectives of this phase are:

- a broadly based understanding of the process and stakeholder input in to its design,
- a well researched, credible but flexible set of environmental and technical criteria that form the basis of subsequent siting decisions, and
- their initial application at a provincial level to define the areas having the highest potential for meeting them.

The second phase focuses on the solicitation of interest from possible host communities in areas meeting the general technical and environmental requirements defined in the proposed criteria and on the process of testing public reaction and concern. The product of this phase is one or more candidate host communities where a publicly expressed interest in pursuing further investigation of the development, jointly with the Corporation, is expressed. In effect, the proponent is seeking a direct invitation from the community to look for a site, conditional on the community's direct involvement in the project's decision making.

The third phase involves the detailed site selection, site evaluation and the environmental and socio-economic impact assessment of candidate sites. This stage culminates in independent decisions by the proponent and the community on their support of particular sites and the filing of the required documentation for formal regulatory and public review under the appropriate legislation. This stage is initiated by the formation of a broadly based group drawn from the community who act as direct participants in the decision making and auditing of the proponents work. Figure 2 provides a conceptual illustration of third phase activities and their sequence.

In summary, the key features of this process are:

- a basic standard for environmental protection and technical integrity is set at the beginning of the process,
- a public acceptance and consent is a prerequisite to each step in siting,
- the process is open and maximizes public involvement from the earliest point,
- the process is flexible and responsive to public input, and
- participation in the process is voluntary by both proponent and community and either can opt out at any time.

In effect, the approach very deliberately extends the notion of public participation beyond its traditional public information and consultation focus to participation in the actual decision making and for this reason has been termed a "co-management" approach.

Siting Progress

The process described above was publicly initiated in August of 1988 with the wide distribution of a discussion document on the process, including a review of siting experience elsewhere (4). Prior to that extensive consultation with a wide range of stakeholders and other proponents on the general development strategy and siting approach had been undertaken.

This was followed in October, 1988 by the publication and release of a second discussion document proposing the environmental and technical criteria that could be applied and their application at a provincial level to identify those areas having the greatest potential for finding a qualified site (10). As an illustration of these results Figure 3 provides a map identifying such areas in terms of the presence of key superficial geological characteristics in areas not excluded as being of low potential based on various exclusionary criteria.

This document or short summaries of it were disseminated widely, particularly to all municipalities, urban and rural, associated with areas of potential interest. In November 1988, a series of thirteen open houses around the province were held to present this work and to more generally discuss the hazardous waste issue with the public. The venues were selected as the same locations that previous Clean Environment Commission hearings had been held. Any deliberate targeting of areas of interest was avoided. However, the open houses did attract significant interest from local elected officials and in many cases represented the initial contact for subsequent discussions with candidate host communities.

Since January of this year, the Corporation has been responding to expressions of interest, primarily from local councils or groups of councils. To date 24 such inquiries involving 36 municipalities have been received. The normal practice is to meet with them, present the development concept and respond to questions. Where continuing interest is expressed, the Corporation recommends that the council(s) sponsor a well advertised public information session, preferably in an open house format, to allow their constituents to receive more information and to raise concerns. These events have been very deliberately presented as being community sponsored but on the basis that the councils are simply investigating the possibility of the development without obligation or support. Participants are asked to express their reaction through a questionnaire on an anonymous and voluntary basis, avoiding any perception that people are being asked to vote on the issue in a formal or binding way. The responses remain with the sponsoring councils for analysis with no obligation to involve the proponent.

To date 13 groups of councils have taken this step and 22 such events have been conducted, including more than one event to test reaction the same community. A wide variation in response, both in terms of attendance and reaction has been received. The attendance at these events has ranged from as few as twenty people to as high as 550 with average attendance being about 100 people per event. In terms of reaction, those attending are typically those with concerns and in some instances are openly opposed initially. However, the results of the questionnaires indicated that in all but one community a majority of the respondents supported continued investigation of the development by their community. The support level ranged from 30% in one case to 70% or greater in 8 communities. A trend toward higher positive response was noted from communities where attendance was the highest.

At this point in time two communities, have made the formal decision to invite the Corporation to initiate detailed siting work and have organized community advisory committees to be involved in the work. Nine more are in various stages of measuring the degree of public interest by sponsorship of a continued dialogue. Three have indicated that they do not wish to be given any further consideration. It should be noted that all prospective communities offer good transportation access and the majority are located within 50 km. of major urban centres.

The Corporation has initiated detailed site selection work in two areas and depending on the number of communities ultimately involved, hopes to complete the site specific technical and environmental evaluation by the fall of 1989. This will be followed by the formal environmental impact assessment and the filing of a formal regulatory application, inclusive of a site selection recommendation with the Department of Environment by early 1990. Having said this, the schedule is essentially dictated by the rate at which the communities involved want to proceed and is not being forced at the expense of community dialogue.

Discussion to Date

Experience with this process to date offers a number of lessons that are being applied as it proceeds and which may be of value to others. Similarly, the nature of the issues and concerns raised by the public are of note.

A general observation made was that a low public response to informational events should be viewed as a potentially negative response. This was seen in some of the earlier communities involved where low but positive response was interpreted by councils as encouragement to proceed with further investigation, but where subsequent reaction was very negative, largely from people who had not attended the informational events. The conclusion drawn from this is that it should be assumed that most members of the public will take an inherently negative view of the development at least until it is explained directly to them. Therefore, the potential for gaining support is a function of the number of people the proponent has an opportunity to talk to early in the process. This was addressed subsequently by more aggressive advertising of the events, mainly through direct mailing of notices rather than newspaper advertisement, and in several cases by organized telephone campaigns by the sponsoring councils.

Related to the above point is the fact that a the number of such events or initiatives are required to properly gauge public response to proceeding. This varies with the particular community but usually a single event is insufficient and should be followed up by public meetings, meetings with specific interest groups, school presentations or simply making staff available on a drop in basis.

The need to accurately convey the status of the consideration being given the development is important. If a rumor starts respecting a specific location in a community or any involvement of vested interests prior to having communicated with a large number of people, the potential for a consensus on further investigation is significantly reduced since this will create a focal point for emotional opposition. The one major negative response received was largely caused by this situation. In this context, it is important that the proponent not be perceived as initiating any detailed siting work before community consent to do so has been publicly given through local elected officials.

Another lesson relates to the definition of the community. While they tend to identify themselves along jurisdictional lines, the definition must remain flexible and essentially be established by the people expressing interest and concern. In particular, it is important that both urban and rural municipalities be involved collectively with the rural group being the lead if either assumes this role. Similarly where there is the apprehension of impact, neighboring municipalities should be acknowledged as legitimate stakeholders and brought into the process. Within the community all potentially interested groups and points of view should be drawn into the dialogue as early as possible, again with acknowledgement of their legitimacy.

A final point worth conveying relates to how the proponent organization presents itself in these informational sessions. It is not a public relations exercise and should not be portrayed as such. Information material should be functional and readily available but not promotional or glossy in appearance. The development of a community consensus requires a lot of individual contact and, as a result, the process is very staff intensive. In our case, all of the Corporation's staff from the Board Chairman to clerical staff have been involved. This requires both a significant personal commitment by staff and a solid common understanding of the process by people from a range of disciplines. This commitment and the genuine interest in the undertaking is both recognized and appreciated by the public.

The range of issues and concerns that are raised by the public during this process are of interest. Table 1 provides a general summary of the main issues and concerns noted in three overall categories. A common observation is that those related to environment/health/safety and the decision making process itself receive priority in the public mind, irrespective of the communities particular circumstances. Little interest is expressed in the economic benefits of the development unless these aspects have been satisfactorily addressed. This experience tends to verify the value of mitigation, rather than compensation as the most desirable approach to dealing with real or perceived impacts (11). The message to a proponent is not to priorize the development's promotion on the basis of economic development.

The concept of risk must be addressed frankly and openly. The suggestion that this or any other industrial development is riskless is not believable and should be avoided. Instead, risks related to accident, health impacts and transportation should be noted and compared to those normally accepted by a community on a voluntary basis. The proponent must be prepared with factual and verifiable references in this area. In addition, he should be prepared to undertake the assessment of the incremental risks involved in the specific development as part of the investigation process, along with addressing mitigation options and contingency planning. It should also be made clear that this be done prior to expecting a firm commitment of support from the community and with full disclosure to the community.

The issue of location relative to population must be handled with in the context of two extremes of view point. The two questions are: why not locate such a development in some remote location or, conversely, why not locate near the principal source of waste generation. As a basic principle, it should be stated that the development is not appropriate anywhere if possess an unacceptable risk to population. Our experience indicates that under the assumption that the proponent can demonstrate the development's integrity and reliability, public acceptance can be achieved at a location that offers natural mitigation of residual risks and is economically viable. It is generally recognized that few if any locations are without population and that all consumers in an industrial society are directly or indirectly responsible for the problem and have some responsibility for solving it.

The long term commitment of the proponent and the degree of trust that can be placed in him are major issues. This is compounded by a general distrust of technology, industry, particularly the waste management industry, and of policy decisions made by governments at all levels. To accept this type of development, the public are looking for mechanisms that provide an element of control in perpetuity over the development and its proponent. There is a continuing strong preference for public sector proponent participation in the development, simply because they associate some permanence with government as an institution. A purely private proponent suffers, often unfairly, from the industries past reputation and the belief that profit will always take precedence to the communities interests. The basic scepticism of any proponent's motives and long term stability is manifest by the public's desire for a role in the management of the proponent organization, full disclosure of information related to the development and its operation, and the option of independent verification of development proposals and ultimately the operation and its monitoring.

A final issue worth noting relates to how a community hosting such a development will be viewed by others. An inherent concern which, while not often expressed directly, nevertheless exists is that a community hosting such a development will be negatively perceived. The connotation of being a dumping ground for others or as being desperate for any kind of development concerns many people and needs to be discussed openly. Our experience shows that this discussion may ultimately result in the opposite conclusion. Perhaps as a reflection of society's increased environmental awareness and the global sense of the issue, people seem increasingly receptive to the notion that those contributing to the solution of environmental problems will be perceived positively rather than negatively. This enhancement of community self image has been observed with similar developments elsewhere and can be verified through contact between communities.

General Application of the Process

While the successful the application of a "Co-management" development process in this instance has not been fully demonstrated, the experience gained in applying it provide some guidance to others undertaking similar undertakings. The following points are worthy of consideration by proponents of projects for which public acceptance could be the critical factor in their successful execution:

a) Public resistance to economic development undertakings, particularly those perceived as transferring risk to a minority for the majorities benefit, is largely based on belief that local control and interests have been preempted in the development's decision making process.

b) There is a fundamental need for proponents of such undertakings to genuinely acknowledge the legitimacy of the public's interest and accommodate it in the project management process in order to overcome this resistance,.

c) Proponents of such developments will have to extend the notion of public participation beyond its current scope, and the paternalistic public relations connotation it often carries, to include meaningful involvement of those directly impacted in the development decisions.

d) As a result, proponents will have to fully integrate public participation into the project management activities from an early stage and extend the concept through into the operating phase of the development.

The application of this approach to the development projects will require changes in many of the basic attitudes and principles inherent in traditional project management disciplines. These including acceptance of greater uncertainty in schedules, incorporation of greater flexibility in technical decisions and project planning, greater disclosure of information earlier in the process and acceptance of greater external input. An inevitable result will be the requirement for greater pre-investment in such undertakings. However, the approach should serve to mitigate the risk of its loss as has been common with many controversial developments.

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TABLE 1

TYPICAL COMMUNITY ISSUES AND CONCERNS

1. Environment/Health/Safety

- Types of Waste
- Emissions (Air and Water) and their Monitoring
- Environmental Standards and their Enforcement
- Health and Environmental Effects of Emissions
- Risk of Accidents
    - Transportation
    - Plant Failure
- Risk Relative to those Currently Encountered

2. Site Selection and Decision Making Process

- Location Relative to Waste Source
- Remote Location Option
- Suspicion that Site Decision is Already Made
- Distrust of the Proponent
    - Poor Industry Image
    - Suspicion of Private Operators/Profit Motive
    - Proponent Qualifications
    - Long Term Commitment
- Distrust of Government
    - Can Change Standards/Policies
    - Sale of Public Proponent
- Degree of Local Influence and How It is Applied
- Method and Timing of a Local Decision on Support
    - Will Support for Investigating it be Misinterpreted as Approval
    - Will a Plebiscite or Referendum be Held
- External Perception of the Host

3. Economic Effects

- Employment Generation
- Availability of Employment to Local People
- Attraction of Other Industries and What Kind
- Tax or Equivalent Benefits
- Infrastructure Improvements and Costs

FIGURE 1
PROPOSED SITE SELECTION PROCESS

PHASE 1
Site Selection Process and Criteria Development

KEY STEPS

- Background Information Collection and Government Agency Input
- Prepare Site Selection Process Document
- Prepare Proposed Site Selection Criteria
- Provincial Screening to Identify Candidate Regions
- Selection of Candidate Regions
- Public and Stakeholder Review of Process

PHASE 2
Selection of Candidate Host Communities

KEY STEPS

- Data Collection on Candidate Regions
- Technical Screening of Regions
- Community Consultation in Candidate Regions
- Define and Evaluate Potential Candidate Host Communities
- Select Candidate Host Communities

PHASE 3
Site Selection and Evaluation

KEY STEPS

- Establish Community Advisory Committee(s)
- Finalize Siting Criteria and Identify Mitigation Issues with Committees
- Identify Candidate Sites
- Detailed Evaluation of Candidate Sites
- Confirmation of Community Support
- Site Ranking and Identification of Preferred Development Alternatives
- Preparation of Regulatory Proposal

FIGURE 2
CENTRAL FACILITY SITE SELECTION AND ASSESSMENT PROCESS

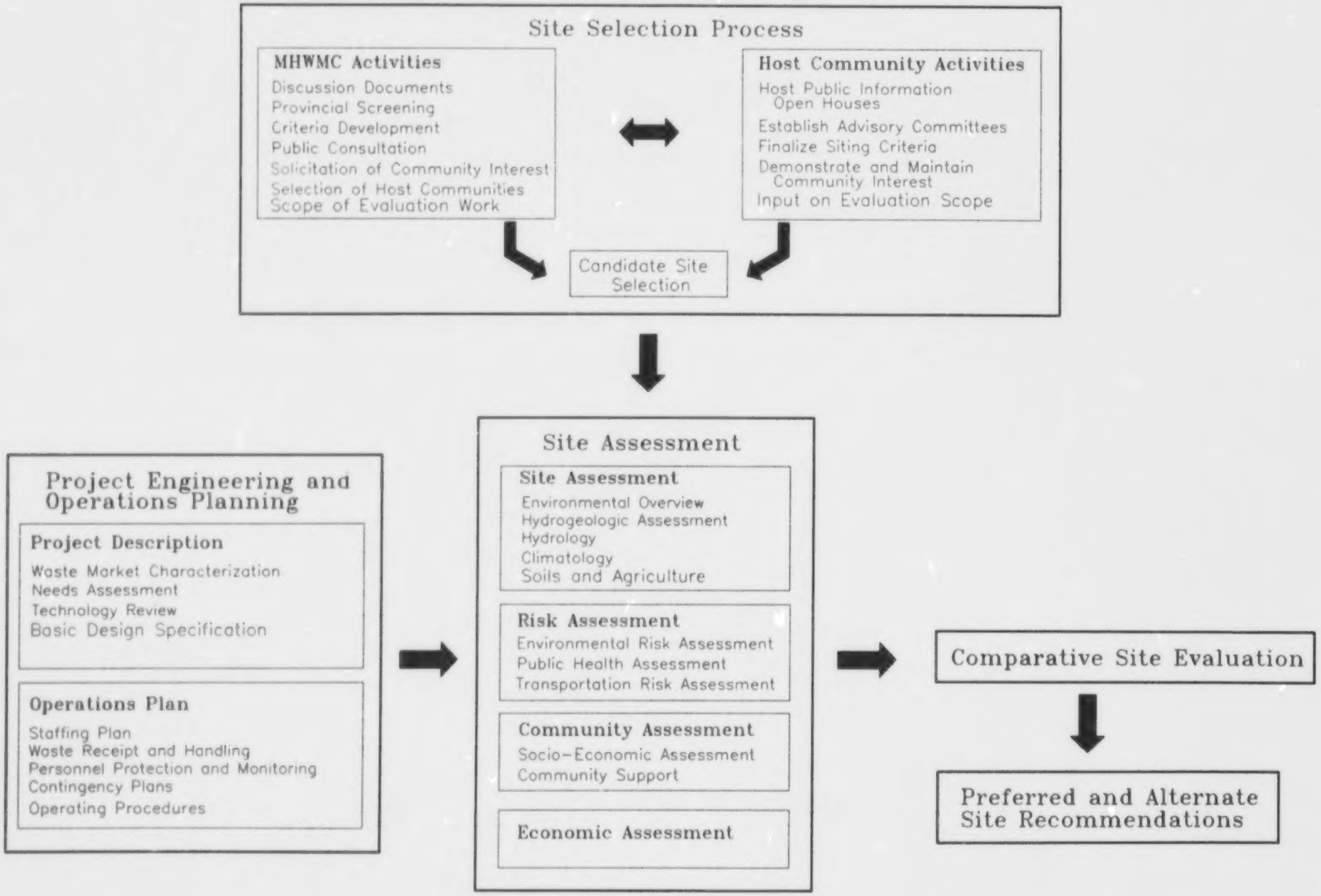
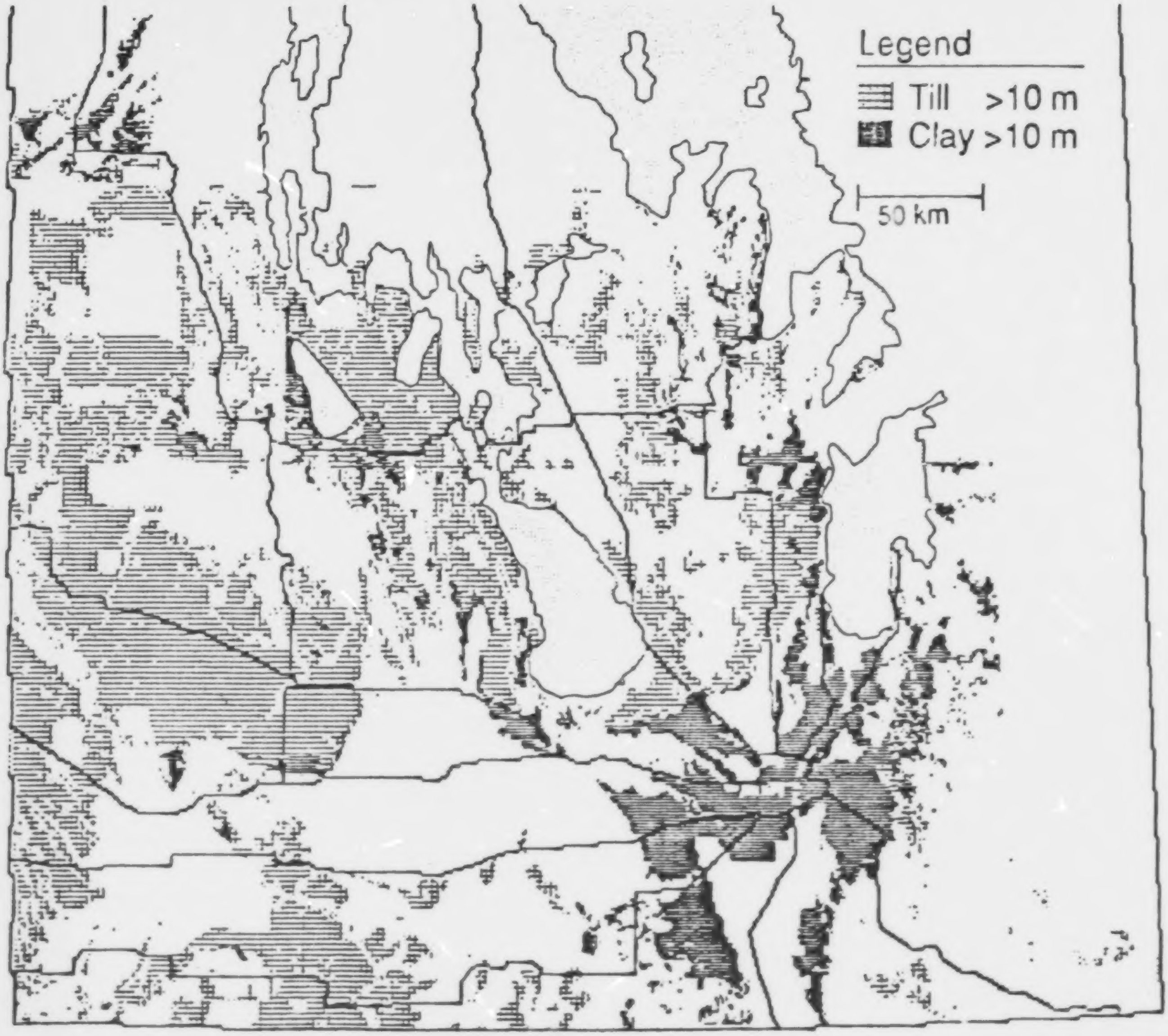

Site Selection Process
MHWMC Activities
Discussion Documents
Provincial Screening
Criteria Development
Public Consultation
Solicitation of Community Interest
Selection of Host Communities
Scope of Evaluation Work
Host Community Activities
Host Public Information Open Houses
Establish Advisory Committees
Finalize Siting Criteria
Demonstrate and Maintain Community Interest
Input on Evaluation Scope
Candidate Site Selection
Project Engineering and Operations Planning
Project Description
Waste Market Characterization
Needs Assessment
Technology Review
Basic Design Specification
Operations Plan
Staffing Plan
Waste Receipt and Handling
Personnel Protection and Monitoring
Contingency Plans
Operating Procedures
Site Assessment
Site Assessment
Environmental Overview
Hydrogeologic Assessment
Hydrology
Climatology
Soils and Agriculture
Risk Assessment
Environmental Risk Assessment
Public Health Assessment
Transportation Risk Assessment
Community Assessment
Socio-Economic Assessment
Community Support
Economic Assessment
Comparative Site Evaluation
Preferred and Alternate Site Recommendations

FIGURE 3

AREAS OF GREATEST INTEREST IN SOUTHERN MANITOBA


Legend
▤ Till >10 m
▩ Clay >10 m
50 km

Environment and Economy
Partners for the Future

L'environnement et l'économie
partenaires pour l'avenir

TITLE: International Centre for
Sustainable Development
SESSION: B.5
BULLETIN NO.: 18

TANNER ELTON

"This conference is the springboard for developing concrete steps towards the establishment of the International Center for Sustainable Development," said Tanner Elton.

He explained that the mission of the center was to promote the application of environmentally sustainable economic development within and between the public and the private sectors, regionally, nationally and internationally. To fulfil this mission a number of objectives must be met: to promote integration into decision-making; be involved in information exchange and education; be a vehicle for promoting environmentally safe activities in industry; and involved in training and development at all levels.

Clients would include governmental agencies, non-government organizations, academia, business and industrial sectors, and the publics of Canada and other nations. Output from the center would consist of policy research and analysis, promotion of decision-making models, development and promotion of demonstration projects or project management, training and development, technology transfer and most importantly, database creation and integration.

The institute would serve as a network to other centres and institutes, conduct seminars and conferences on areas of concern, provide direct services (i.e., training), and participate in joint projects with government and industry. A non-profit organization, it would be financed by a public and private partnership.

"The concern for sustainable development creates the need for a center as a focus for sustainable development and a demonstration of sustainable development," said Elton. It would be a co-location of departments, agencies and associations and act as a joint facility."

"We are alive to the concerns of the large expectations especially in this time of restraint. The structure and nature is on the table and we anticipate that within two months definite plans on the direction of the center will be put forward," he said.

GERRY FITZSIMMONS

He explained that this is the first testing in an audience atmosphere. "We want feedback on the process and we welcome any comments."

KEN HARLEY

"The idea for the Centre is a good one," said Ken Harley, "but care must be taken on the kinds of activity in order to establish international credibility." The center should work with other countries to develop solutions for problems and should not have just one government's view. Because developing countries have their own ideas, they too should be consulted.

The center should work with the private sector and provide expertise to other countries.

RAY COTE

Ray Cote described the importance of a regional center with similar functions as the International Center for Sustainable Development. Surveys conducted by Dalhousie University confirmed the requirement for such a center.

"There should be a network of regional centres linked to the international center," said Cote. Linkage functions would include coordinating, acting as a clearing house for information or a source of information on sustainable development, coordinating national issues, and, facilitating membership of interested people.

ISSUES RAISED FROM THE FLOOR

. Get public input, local and international, before finalizing mission.
. Process must involve the international community.
. Private sectors should be approached for support.
. Should focus on sustainable development and not get distracted.
. Need for a persuasive core staff with vision to work with potential clients.
. Should consider the role of "Think Tank" on sustainable development and nuclear power should be its first topic.

PANEL SESSIONS ON THE INTERNATIONAL CENTRE FOR SUSTAINABLE DEVELOPMENT

Room 12, Winnipeg Convention Centre
Session A5. 10:30 - 12:00 Session B5. 15:30 - 17:00

In September 1988, in a speech to the United Nations, the Prime Minister committed the Government of Canada to establish in Winnipeg a centre which will promote internationally the concept of environmentally sustainable development.

These workshop sessions will provide to conference attendees an opportunity to hear preliminary ideas about the centre and to participate in discussions about its potential role. The afternoon session will be a repeat of the morning session, except that the changes in the panel members, commentators and audience will allow different perspectives to be highlighted.

Chair:

Dan Archer	Director Sustainable Development Manitoba Industry Trade and Tourism

Panel Members:

Gerry Fitzsimmons	Director Federal-Provincial Relations, Environment Canada
Tanner Elton	Deputy Minister, Manitoba Environment

Commentators:

Jack Dubois	Associate Curator, Manitoba Museum of Man & Nature Chairman, Manitoba Environmental Network Member, Manitoba Round Table on Environment & Economy
Art Mauro	President and CEO, Investors Group Inc. Member, Manitoba Round Table on Environment & Economy
Ken Harley	Executive Director, Inter-American Development Bank, Washington D. C.
Ray Côté	Associate Director, School for Resource & Environmental Studies, Dalhousie University Co-chair, Private Sector Environment-Economy Committee, Nova Scotia

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L'environnement et l'économie
partenaires pour l'avenir

TITLE: Land, Water and Energy
Sectors
SESSION: B.6
BULLETIN NO.: 19

DR. W.T. HANCOX

"Energy production, distribution and use are among the most environmentally stressful human activities," said Dr. Hancox. Sustainable development will require energy choices that consider the consequences of use, as well as the cost of production.

"An ideal energy source must be commonly available, as well as, extracted, converted and distributed with well-understood technology, and minimal pollution," he said. Nuclear energy, he said, meets these requirements.

Dr. Hancox said a strong international structure regulates protection standards and management practices. "It is a universal principal that no wastes are released to the environment," he said. Unlike other energy-generating methods, Dr. Hancox said nuclear power completely controls all wastes produced. "The fuel and uranium is very compact, with all waste contained in the spent fuel." Uranium reserves contain ten times more energy than hydrocarbon reserves.

DR. PETER LARKIN

Fish are an invaluable source of protein for mankind and are a barometer of the health of aquatic environments said Dr. Larkin. In 1988, 80 million tons were harvested. Lakes and streams integrate the consequences of land activities, affecting flow patterns, water quality, bottom sediments, and productivity.

River estuaries, along with continental shelves, are the focal points for marine transportation, wastes discarded at sea, oil and chemical spills, and oil and gas exploration and extraction said Larkin. At the same time, he said, estuaries and shelves provide 70% of seafood production.

Dr. Larkin said a national sustainable development fisheries network was begun recently to seek ways to manage fisheries for a sustained harvest. "The prime purpose of the network is to facilitate communication and to contribute to Canadian policies and programs," he said.

Operational details will be handled mostly at the local level, with regional nodes and local groups to deal with particular issues.

Three issues to be tackled in regional and national workshops: 1) define the present status, goals and objectives of sustainable development for aquatic environments; 2) build sectoral and interagency linkages and simplify decision processes; 3) involve user groups.

PROF. VACLAV SMIL

"Canada is the most wasteful and environmentally irresponsible country," said Professor Smil.

"If new houses each year in Canada were built to readily achievable energy efficiency standards, energy would be conserved and negative impacts of fuel extraction and consumption would be reduced equivalent to the construction of a 2.5 gigawatt power plant."

Smil said similar savings would occur if commercial buildings were constructed to these standards, or if only the more fuel efficient automobiles were sold. "There are no laws to prevent the construction of inefficient homes, commercial buildings, and cars."

"Energy consumption is governed only by demand," said Smil, and with no thought given to the limitations of supply or the environmental costs." That it is possible to function comfortably at lower levels of energy use is evident from the fact that per capita use was 30% less in 1962, he said.

Population growth makes achievement of sustainable development difficult said Smil. There is a human tendency to waste resources on grand and expensive projects, ignoring "wimpy" small-scale solutions (a new powerplant rather than triple-pane windows).

In Canada, taxation of energy or a change in attitude towards waste, or both will be required to diminish consumption, Smil concluded.

DISCUSSION

. Environmentally sound energy-production technology can be more expensive than current technology.
. New conservationist technologies often have discouraging problems in early stages.

SUSTAINABLE DEVELOPMENT: GETTING THE ENERGY, SCIENCE AND TECHNOLOGY RIGHT

Dr. Bill Hancox

Vice-President, Waste Management
AECL Research Company, Whiteshell Nuclear Research Establishment
Pinawa, Manitoba R0E 1L0

In an attempt to explain the transforming power of science, engineering and technology, the Canadian Institute for Advanced Research[1] reminds us that the ability to sustain and improve human life on earth through the application of knowledge is a very recent occurrence. The Institute states:

> "For the millennia of recorded history, persons in all societies lived in circumstances characterized by a relatively short life span and by the subordination, in war and peace, of the lives of the majority to the authority of a privileged few. But throughout history, man's gradually evolving technology and slowly developing scientific understanding have enabled existing conditions of life to be sustained or be significantly improved."

In this struggle, the services provided by energy have played a key role by expanding mankind's command over time and space. Of the two, "time", may be the higher valued.

The Nobel laureate Alvin Weinberg suggests:

> "If we ask why man has, ever since the beginning, chosen to use more energy, it is probably because he values time more than he does energy ... we are mortal; each of us knows that his time on earth is limited. I suspect time is viewed as one of our most precious resources."

In a way, energy is the currency of time and space. But the environment may be the reference price. As Time Magazine suggests, 1988 may be the year Earth spoke back.

Recent international and national events and increasing public concerns have raised the awareness of environmental issues and their interrelationship with the economy under the general rubric of sustainable development. These events include the Brundtland World Commission on Environment and Development, and its April 1987 report "Our Common Future"[2]; the International Protocol on Ozone Depletion signed in Montreal in 1987; and the Economic Summit and the Conference on the changing Atmosphere, both held in June 1988 in Toronto.

The production, distribution and use of energy are amongst the most environmentally stressful of human activities. If we are to continue to strive for the improvement of prosperity for present and future generations, we will have to make energy choices within the context of sustainable development. The National Task Force on Environment and Economy[3] has given us a useful definition of that:

> "At the core of the concept of sustainable development is the requirement that current practices should not diminish the possibility of maintaining or improving living standards in the future. This means that our economic systems should be managed to maintain or improve our resource and environmental base so that the generations that follow will be able to live equally well or better."

How do we design an energy future to these "new" specifications? The answer lies in the management of energy induced environmental stress and requires an understanding of two natural functions:

- The source function (e.g. the depletion of strategic resources).

- The sink function (e.g. the biosphere's natural cleansing and regenerative capacity).

I suggest that our understanding of the source function is much more advanced than it is for the sink function. Today, understanding of the source function allows many energy resources to be treated as commodities; for example, there is an accurate knowledge of the world's coal resources and their distribution, how much coal has been used and the vast reserves that are left. On the other hand, knowledge about the sink function (i.e. the capacity of the natural environment to absorb man-made pollutants) is still in a primitive state. Our ignorance distorts energy source decisions. Understanding is just beginning to develop on the global consequences of releasing to the atmosphere the by-products of combustion of fossil fuels. Sustainable development requires that the source and sink functions, and their inter-relationships, be linked with appropriate energy conversion technologies in such a manner that environmental stresses are minimized. This requires getting the science and technology right.

Since the discovery of fire, mankind's ability to harness energy has been constrained by limited access to the supply of natural resources. Use led to depletion. Knowledge and technology followed, extending the energy utility of a particular natural resource. "Our Common Future" correctly advocates energy efficiency as the first defence perimeter for the protection of the environment. But energy efficiency must also meet the new criteria of sustainability. For example, known substitutes for CFC (an important greenhouse gas) are far less energy efficient when used for refrigeration. "Our Common Future" also advocates increased energy to raise the standards of living of increasing world population. What are the ideal characteristics of this incremental energy supply? I suggest the following ideal energy source characteristics for your consideration:

- The required strategic materials should be unconstrained and geographically dispersed.

- The knowledge system to extract, convert, distribute the energy should be globally available.
- The understanding of the environmental stress associated with the use of the energy source should be comprehensive, allowing any releases to be managed within the biosphere's absorptive capacity.

It is only within the last 50 years, following the discovery of nuclear fission, that man has harnessed an energy source that is knowledge based. I suggest that nuclear-electric generating stations represent the first generation of energy machines; that is, an energy source that does not rely on large-scale natural resource utilization, but on the application of technology to produce energy with very little natural resource input. Nuclear power resulted from the investment of intellectual rather than resource capital. For the first time, the science and technology was done up front.

Today, there are more than 400 commercial nuclear power stations operating in 23 countries, providing 16% of the world's electricity. Many of the developed countries now produce from 50% to 70% of their electricity by nuclear power. Another 100 stations are being constructed and will enter service during the next decade, increasing the total electricity capacity by a further 30%

Canada has 4% of the world's nuclear generating capacity and in the early 1990's when current construction has been completed, its share will rise to 5%. Ontario receives more than 50% of its electricity from nuclear power and this will rise to 70% by 1993.

The development and deployment of nuclear power provides useful lessons for selecting and combining energy options to attain sustainable development. Two characteristics are particularly pertinent:

- The energy conversion technology and environmental protection standards were developed in parallel.
- The fission process provided strategic energy security from an abundant natural resource (uranium).

A strong scientific basis has been established for protection standards and management practices. Since 1928, the International Commission on Radiological Protection (ICRP) has reviewed, on a continuing basis, all scientific information on the effects of radiation relevant to life and recommended allowable radiation doses and radiation practices that provide acceptable protection for workers and the public. The ICRP has been so successful in its task and is so widely recognized for its impartiality and integrity, that its recommendations have been adopted by most countries, including Canada, as the basis for their national standards.

The early recognition of the potential hazards of radiation led the nuclear industry and its regulators to adopt a fundamental principle that is unique in industrial practice. That principle is that the wastes from nuclear reactor operation should not be released to the environment, but should be contained and properly managed; in other words, there should be essentially zero emissions. Strict environmental controls and procedures to achieve this are in effect at all nuclear generating stations. The major part of the cost is associated with internalizing the environmental risk by containing the wastes and managing them.

In Canada, 99% of the radioactivity associated with the nuclear generation of electricity is used uranium fuel. The major positive factor in managing the used fuel is that fission energy in uranium is highly concentrated. One kilogram of uranium has the energy content of 20,000 kilograms of coal. In contrast to coal, all of the radioactive by-products are contained within the used uranium fuel.

The used fuel produced since 1962, when the first CANDU reactor began operation, would fill one olympic-size swimming pool. Today, the used fuel is stored in water-filled bays at the reactor sites. Twenty-five years of experience shows that this method of storage is safe and economic for many decades.

It is intended to remove used fuel from the storage pools and permanently dispose of it in such a way that it will not require the care and attention of future generations. There is now an international scientific consensus that burial deep in stable geologic formations is the most feasible method for isolating the used fuel till radioactive decay renders it harmless. Every country with a major nuclear power program is pursuing deep geological disposal for nuclear fuel waste. Several safety assessments have been completed, including those done by Sweden, Switzerland and the European Economic Community. They have concluded that deep geologic disposal is safe for times ranging from thousands to hundreds of thousands of years.

The Canadian disposal concept is the product of ten years of comprehensive research. The used-fuel assemblies will be sealed in corrosion-resistant containers and then buried in a carefully engineered vault 500 to 1000 metres below the surface in rock of the Canadian Shield. The intrinsic containment provided by the rock mass is complemented by a series of engineered barriers which include the used fuel itself, the outer shell of the used-fuel container, and the sealing clays that surround the containers and fill the excavated openings.

Our confidence in the safety of the concept is sufficiently strong that we will be submitting our assessment for review by an independent, third-party panel under the Federal Environmental Assessment Review Process. The review will include public hearings, so the general public will be able to make an informed decision on acceptability of the disposal method. I am confident that when all of the facts are presented, the review panel and the public will agree that used fuel can be safely isolated from our environment.

With regard to energy security, the laws of nature enable an enormous amount of energy to be derived from the world's ample uranium resources. The strategic implication of this was the main driving force for the development of the peaceful application of nuclear energy. In a classic paper in 1964, Wilfred Bennett Lewis[4] summarized the argument by showing that nature has provided enough nuclear fission fuel in uranium and thorium to supply the world's entire energy needs for thousands of years. By almost any definition, that meets the requirements of sustainability. Using only currently known technology, the world's uranium resources contain ten times more energy than the total remaining fossil fuel resources, including coal, oil, and gas.

The net result of investing in the science and technology underpinning nuclear energy is the freeing of mankind from the finiteness of the earth's natural resource base (the source function) while accommodating the sink function through containment and management of the by-product of nuclear power generation.

I suggest that, with the exception of nuclear energy, we have made little progress in understanding, quantifying, and establishing standards to manage risks associated with our energy options. Risk assessment and management are at the core of the design and operational philosophy of nuclear technology.

The fundamental philosophy of environmental protection, combined with experience of international cooperation in risk assessment and in establishing radiation protection standards, place the international nuclear energy community in a singularly strong position to help in risk assessment in general.

The lesson from nuclear energy is to understand the risks and manage them properly. We need to bring our understanding of the risks of other energy options up to the level of that for the nuclear power option.

I would like to conclude with the closing sentences of the energy chapter of "Our Common Future".

> "Energy is too important for its development to continue in such a random manner. A safe, environmentally sound, and economically viable energy pathway that will sustain human progress into the distant future is clearly imperative. It is also possible. But it will require new dimensions of political will and institutional co-operation to achieve it."

[1] "Innovation and Canada's Prosperity: The Transforming Power of Science, Engineering, and Technology", Report of the Canadian Institute for Advanced Research, October, 1988.

[2] "Our Common Future", Report of the World Commission on Environment and Development, Oxford University Press, Oxford, 1987.

[3] "Report of the National Task Force on Environment and Economy", submitted to the Canadian Council of Resource and Environment Ministers, 1987 September 24.

[4] W.B. Lewis, "How Much of the Rocks and the Oceans Power? Exploiting the Uranium-Thorium Fission Cycle", Atomic Energy of Canada Limited Report, AECL-1916, April 1964.

THE SUSTAINABLE FISHERIES NETWORK

P.A. Larkin

Department of Zoology, University of British Columbia
6270 University Building, Room 2354
Vancouver, British Columbia V6T 4V2

Introduction

We all know that fish are an invaluable source of protein food for mankind. What we often forget is that, together with aquatic birds and mammals, fish are barometers of the health of freshwater and marine environments. What we also often forget is that our lakes and streams are integrators of what we do on the land. Agricultural and forestry practices determine the character of lakes and streams, the pattern of their seasonal flow, the nature of their bottom sediments, their productivity and their contamination with fertilizers, pesticides and herbicides. The use of streams to provide drinking water and to carry away sewage wastes and industrial wastes may mean, if you live near the mouth of a river, that the glass of water you drink may perhaps already have been through a pulp mill, a steel mill, seven other people and many more fish.

The estuaries of our major rivers are the final integrators of the uses of the watersheds they drain. These estuaries, together with the adjacent continental shelves, are also the focal points for a great deal of marine transportation, so they may also be the recipients of wastes discarded at sea, and of oil and chemical spills at sea. They are doubly vulnerable to oil spills for it is in the shallow coastal seas that oil and gas exploration is concentrated. Yet these same estuaries and adjacent shelves are the site of 70% of the world's production.

Aquatic environments are also the ultimate recipients of air borne materials. Acid rain drops are falling on our heads, but the acid may have come from far afield. Air borne contaminants turn up in the most unexpected places, even in such places as the Canadian Arctic where they may accumulate in the animals at the end of the food chains.

The message, loud and clear, is that fish and other organisms in our lakes, streams and oceans are barometers that respond to the way in which natural resources are used or abused. If there is something wrong with the fish, there is reason to worry for humans. More comprehensively, if there is something wrong with the natural functioning of aquatic ecosystems, there is something wrong with the way in which humans are conducting their affairs.

It was with these thoughts in mind that several of us who have made a life's work of fisheries and aquatic resource management have welcomed the call of the Brundtland Commission for sustainable development. We are committed to the principles that fisheries should be managed so as to be sustainable, that aquatic environments should be protected and enhanced to ensure their long term capability to produce fish, and that together with those concerned with other resource uses we will seek ways of achieving sustainable development through integrated resource management.

The Sustainable Fisheries Network

To put our principles into practice, we have begun by establishing a national network of the various participants in the fisheries and aquatic science activities in the country. The notion of a network was spawned in August of 1988, fertilized at a meeting of a steering committee in December, incubated over the winter and formally hatched yesterday (May 17, 1989) at a workshop convened here in Winnipeg. The Rawson Academy of Aquatic Sciences has acted as a midwife for the delivery and Fisheries and Oceans Canada has generously provided for the midwife's costs as well as providing both advice and moral support.

The prime purpose of the network will be to facilitate communication among all groups and agencies concerned with fisheries and aquatic environments. We will strive not only to gain from each other's experience, but to make our collective knowledge and experience available to the Provincial and National Round Tables. We hope to contribute to the formulation of Canadian policies and programs for sustainable development.

We recognize that many, if not most, of the operational details of implementing the principles of sustainable development can best be dealt with at local levels. We plan then, to set up regional network nodes for which the coordinators will be formally named in the next few weeks. It is likely that the regional nodes will bud off local groups from time to time to consider particular issues.

Much of the discussion at our workshop here in Winnipeg over the last two days was concerned with an exchange of views about the issues that are currently most pressing in the sustainable development of fisheries and aquatic environments. We compiled a list of fifteen issues and then decided which three we would first tackle in regional and national workshops. Those three issues were:

1. The need to precisely define the present status and the goals and objectives for sustainable development for fisheries and aquatic environments, both marine and freshwater;

2. The challenges for institutional change, how best to build linkages to cross over sectoral and interagency barriers and at the same time to simplify the processes for making decisions;

3. How best to involve user groups or stakeholders in decentralized resource management.

We will address these issues in our first series of workshops with the hope that there may follow some demonstration projects or trial ventures to see whether what we have developed will stand up in practice.

Conclusions

Fisheries managers and fishermen of all kinds have long been familiar with the precepts of conservation and stewardship of natural resources.. We take to sustainable development like a duck takes to water. The Brundtland Commission Report and the enthusiastic Canadian response have been a great morale booster. We accordingly plan to give our best shot to helping Canadian performance in the achievement of the goals of sustainable development. The Sustainable Fisheries Network is the first step on what we hope will prove to be a highly rewarding journey.

TITLE: Manufacturing and Retail Sectors
SESSION: B.7
BULLETIN NO.: 20

JOHN R. DILLON

Occurring today is a shift in attitude emphasizing the need for planning for our environmental future. Each sector must recognize its role and responsibility for that future, said Dillon. He cited, industry associations in the chemical, petroleum and mining sectors who have developed codes of practices.

Dillon said "the concepts of product stewardship and life cycle responsibility is becoming a way of doing business for many companies. He said although the practise of conducting environmental audits has been growing, there are limited resources in the world to tackle the many pressing problems. He said a rational process of priority setting needs to be developed, and that any choice will require a significant expenditure. Most important, he said, are choices which are acceptable to a majority and carry the likelihood of real improvement in environmental quality.

Dillon stressed consultation in formulating decisions and policies in a cooperative manner.

DAVID SIMPSON

Times have changed for consumers said Simpson. From a period of complete consumer neglect through growing concern to the current period of acute public awareness.

The Consumer Association of Canada has a history of involvement in environmental issues from the early seventies to present day, he said. While discussions between environmental groups was one of total distrust, a trust building phase has begun among manufacturers, retailers, governments and environmental groups.

Simpson said what is necessary from a consumer perspective, is the continued development of concrete action that allows consumers to choose products, activities and lifestyles that are environmentally friendly.

He said manufacturers must develop new and environmentally sound ways of ensuring that product preparation meets current health and safety guidelines while retailers must find creative ways of marketing and non-packaging. He noted that a start has been made in re-refined auto motor oil, insulation materials made of recycled papers and selected products made from recycled plastics. These products must be greater in number and competitively priced, he said. "The advertising, marketing and packaging industry has got to change," said Simpson. "What's new, hip and has sex appeal will have to re-focus on what is environmentally sound."

The challenge to the industrial producers is to start working on the disposal model in the research and development phase. This must become a critical part in the entry of a product to market.

The Consumer's Association of Canada is working with other groups to develop an environmentally sound packaging program and a new consumer code of environmental rights, said Simpson. "These could be starting points for manufacturers trying to be more consumer friendly in their products."

MARY GRANSKOU

In directing a focus to individuals rather than companies, Granskou cited a number of activities that everyone can participate in. The Blue Box program successfully implemented in Toronto, sorts household garbage into distinct material categories to aid recycling. She also advocates that individuals refrain from using any chemical fertilizers on lawns as well as pesticides and fungicides grouping.

As consumers, Granskou warned that we are used to purchasing goods that are excessively packaged. She urged for the wider use of re-usable pop bottles and less reliance on plastic bags.

Granskou said she is taking her campaign into schools, to community organizations and to retailers and manufacturers to promote Green Consumer Week to increase environmental awareness.

CONCLUSION

There was widespread agreement on the need to address sustainable development by individuals as well as by manufacturers. As well, product life cycles need to be planned through from the conceptual design stage, manufacture, consumer use to ultimate disposal.

THE MANUFACTURING SECTOR AND SUSTAINABLE DEVELOPMENT

John R. Dillon

Manager Environmental Affairs, Canadian Manufacturers Association
#812 - 151 Sparks Street
Ottawa, Ontario K1P 5E3

Thank you Mr. Chairman and let me say how delighted I am to be here today to speak to you about environmental issues from the perspective of the manufacturing community. I am also looking forward to a very stimulating discussion this afternoon with my co-panelists.

I and my colleagues at CMA are often asked to speak on behalf of the manufacturing community in Canada on a wide diversity of issues, whether it be to the media, to Parliamentary hearings or at gatherings of this sort, as if, in this complex political, economic and social entity that we call Canada there could be such a thing as one viewpoint on any issue. What I will try to share with you today is the perspective of one individual based on observations over the past five years of the enormous complexity of environmental issues and their impact upon manufacturing companies.

To the extent that there is any consensus amongst the manufacturing community in this day and age, it is that the environment is a key issue in the day to day operations of many manufacturing facilities across this country. What may come as a surprise, is that this is not a recent development. Twenty years ago, as environmental groups were being formed and universities were establishing departments of environmental studies, many manufacturers were also establishing environmental control departments and assigning specific operational responsibilities to company personnel. During the 1970's many companies adopted formal corporate policies demonstrating their commitment to minimize the environmental impact from their company's operations. Many of Canada's business leaders were among the first to endorse the concept of sustainable development which flowed from the recommendations of the Brundtland Commission and the National Task Force on Environment and Economy.

In addressing myself to the theme of this conference, I would like to illustrate for you a few examples of how I think the manufacturing community has grasped the principle of sustainable development and leave a few suggestions with you of the kinds of things which are necessary to promote this concept.

Since the release of the Brundtland Commission report and that of the National Task Force on Environment and Economy, there has been a great deal of discussion about this new terminology "sustainable development" and what it means in practice. To date, we have already seen a number of conferences, task forces and new organizations attempt to grapple with this issue and I will not attempt to repeat what has already been said in other forums. I am confident that a great deal of guidance on this subject will be forthcoming from the Round Tables on Environment and Economy established at the federal and provincial levels and I am encouraged by the fact that these Round Tables will allow the issue to be addressed at the most senior levels of government, business and public interest organizations. For my own part, I think that sustainable development for the manufacturing community is not so much a list of operational activities as it is a basic philosophy of how we should carry out economic development, both now and in the future. The operational activities needed to protect our environment, both in correcting past mistakes and preventing future ones, have been evolving and will continue to do so. What we have been developing and must continue to stress, not only with industry but with government and the public as well, is a shift in attitude, which emphasizes the necessity of planning for our environmental future and allows each sector to recognize its role and responsibility for that future.

As I indicated earlier, I think this is an attitudinal shift which has been taking place in the manufacturing community for some time. Many companies have taken a pioneering role in developing their sense of environmental responsibility, but it is also clear that many others have not kept pace and are now paying the price. Whether or not the better companies' performance was motivated by a sense of good corporate citizenship and enlightened self-interest, today companies simply cannot afford to be inattentive to environmental issues. All jurisdictions have amended their laws to ensure that the penalties for non-compliance have a real economic impact on the company. More importantly, in this day and age, companies simply cannot afford the public and financial cost of a major spill or the development of a product that is later found to be environmentally unsound. What I think is important, however, is that many companies, both in manufacturing and other sectors, have seen this coming and have taken positive steps to ensure that their company, and their industry, is in a better position to deal with environmental issues.

I would like to give just a few examples of the positive steps that have been taken by industry. As I indicated earlier, many of these activities have been underway for some years, before we began to rally around the concept of sustainable development. Each, in its own way, was a precursor to the concept of sustainable development in the sense in which I have used it, that is, as a philosophy for the management of environmental issues. The list is by no means complete and I am sure that most of you in this room could come up with at least as many other examples.

-Industry associations, for example, in the chemical, petroleum and mining sectors, as well as individual companies have developed codes of practice that demonstrate both a commitment to operate in an environmentally responsible manner, as well as outlining the practical steps required. Within the CMA, we have been giving thought to a handbook of environmental management practices which would be specifically designed for the smaller companies.

-In many communities across the country, companies have gotten together with municipalities and emergency response organizations to develop a contingency plan in the event of an accident. This often includes a citizen education program, communication of what hazardous materials are contained within plants, and working with fire, police and other officials to ensure a coordinated response.

-Industry has recognized its responsibility to develop proactive solutions to environmental problems. Thus, a great deal of resources have been expended in recent consultation efforts to work with federal and provincial governments, labour and public interest groups to develop practical legislative approaches. The Canadian Environmental Protection Act and Workplace Hazardous Materials Information System are two excellent examples of this approach. Although these consultation efforts have their own problems, I think it is generally recognized that the consensus developed represents an appropriate balance and improvement over the way legislation has been developed in the past.

-The concept of product stewardship and life cycle responsibility has become a way of doing business for many companies. This means that a company undertakes the responsibility to ensure that its customers understand any potential hazards that may be associated with the product and the producer tries to ensure that the product is handled safely and disposed of in an environmentally responsible manner.

-In certain instances, concerns about the environmental acceptability of a product has led a company to voluntarily withdraw or scale down its production of a product prior to any regulatory initiative. Thus, several companies have already indicated their intention to eliminate production of CFC's as soon as feasible.

-Recognizing the problem of solid waste, producers and users of packaging material have been examining ways to reduce waste and assisting in developing recycling programs. Thus, the soft drink industry in Ontario was one of the prime movers behind the blue box recycling program.

-A practice of conducting environmental audits has grown considerably in the recent past. The environmental audits allows a company to assess its own environmental performance, not only against regulated standards, but also whether the company is meeting its own policy, and is usually accompanied by an action plan to remedy any problems identified in the audit. Efforts are also underway in industry to develop auditing programs which can be adapted for other companies and other industries.

-A great deal of industry money is currently being spent on research into alternative products and processes (S0 emissions, alternatives to CFC's, etc.). Again, this is often in advance of any regulated requirements.

Obviously, these are only very few examples of the kinds of things that are happening right now in many sectors as we develop new ways to deal with environmental problems. I have not tried to give any precise definition of what we mean by sustainable development, but have only offered a few illustrations of how I think the principle is applied. We have heard many other ideas about what a policy of sustainable development means and clearly we have an unprecedented opportunity to move this issue ahead. Never before has the attention of government, industry and the public been so clearly focussed on the importance of the environment and we must not squander this opportunity to make real improvements.

One of the lasting impressions for me from the report of the Brundtland Commission is the recognition that there are limited resources in the world to tackle the many pressing problems. Thus, the critical issue for all of us is how to make the right choices for the future. The process for making those choices is extremely important and, in concluding, I would like to make just a few suggestions.

We must develop a rational process for priority setting. We will be forced to choose amongst the many pressing environmental issues and it is essential that we have a credible process for making those choices which is acceptable to all. Any choice will require a significant expenditure of resources by all sectors, and thus it is important that those resources be spent in areas where there is a likelihood of real improvements in environmental quality. We should be striving to reach such consensus at an international level. Fortunately, there is increasing evidence (example CFC's) to show that such international cooperation is possible.

The process of multipartite consultation which I referred to earlier has much to commend itself in the development of solutions. Though the effort can be more intensive and time consuming, the process of consensus building amongst all interested parties is more likely to produce an effective solution which is acceptable to those parties who must implement the solution.

The best decisions about our future can only be made if they are informed decisions. One of the things which disturbs people in industry is that in debates about environmental issues, emotion always seems to outweigh understanding. We all have a responsibility to try to educate the public as to the concept of risk and to evaluate environmental issues within that context. I see that burden falling just as clearly on industry, who must do a better job of explaining their products and processes, and educating the public on their own environmental management practices.

Lastly, I think we have to decide whether we wish to formulate our decisions and policies in an adversarial manner or whether we can find a more cooperative approach.

All governments have increased substantially the penalties for environmental offences. While not disputing that these penalties may be appropriate in certain cases, I do believe that far more will be accomplished, in terms of real improvements to the environment, by a cooperative approach between government and industry which has as its primary purpose to ensure that companies and individuals understand their obligations. A program of education programs, regular compliance inspections and joint problem solving will do much more to improve our environment than a series of very costly prosecutions for relatively minor offences.

Obviously, these are only a few suggestions as to how we might approach this issue. We have heard many others at this conference and we will hear many more in the future. The key, as I think I have tried to indicate, is to ensure that we have a process that ensures the decisions we reach can be supported by all interested parties. It is by this process that we will make the best choices for our environment, both now and in the future.

ENSURING A SUSTAINED CONSUMER ROLE

David Simpson

Executive Director, Consumers Association of Canada
P. O. Box 9300
Ottawa, Ontario K1G 3T9

Much has been written, speculated, and talked about on the consumers role in environmental protection, conservation, and enhancement.

This from an era of complete consumer neglect through an era of growing awareness, to now what I would suggest is a period of acute public awareness. The challenge is to unleash the consumer in a manner that is long-term, sustainable, and effective instead of the more likely end result of being just todays fad or 'the thirty second news clip' of the late eighties.

Like public interest, the consumer interest must be marshalled to be consistent with long-term significant improvements in consumption patterns and behaviors that are consistent with the environment that sustains us.

The Consumers' Association of Canada has had a long history of involvement in environmental issues from the early seventies when resolutions called for:

Resolutions

1970	Air Pollution Cleaning Products
1971	Recycling (Also 74/75)
1972	Resort Development in National Parks
1973	Drinking Water Safety Noise Pollution
1976	Pesticides and Herbicides (also 77/82)
1978	Energy Conservation
1980	Nuclear Power (disposal of waste form)
1981	Acid Rain
1982	Toxic Chemicals
1985	Soil Degradation
1986	Canadian Wildlife Ser. Herring Gull Program National Water Strategy

Through a variety of submissions such as:

Nov	1980	Comments on the Draft Policy for Public Consultation and Information Availability-Environment Canada.
Feb	1982	Consultative Committee on IBT Pesticide-Captan
Mar	1987	Minister of the Environment on Draft Environmental Act.

While early discussions between environment groups was one of total distrust, recently a very constructive phase has been entered into with manufacturers, retailers, governments, and environmental groups all addressing similar concerns with less concern about ideology and the other groups motivation and more concern about how to get concrete action. The historical development, like the Niagara Institutes multi-stakeholder process that was helpful in leading eventually to pieces of legislation that had more than just a government perspective, will have long-term positive impacts for the environment, W.H.I.M.I.S., and the C.E.P.A. are all good steps in the long road to creating the kind of legislative infrastructure currently necessary.

While reduction targets of waste seem to be "in vogue" in business and government, increased growth of population and concentration could conspire to wipe-out the gains made by these reductions.

However, if these steps were not undertaken, then the results could be catastrophic. What is necessary from a consumer perspective is the continued development of concrete action that allows consumers to choose products, activities, and lifestyles that are environmentally most friendly.
We may have to look backward not just for historical perspective but for lifestyle examples; recyclable products, the use of glass vs. plastics, reusable metals, organic fertilizers, and basic products may become the norm rather than the exception. The challenge for manufacturers, retailers, and environmental groups is to find ways to make convenience and environmentally most-benign, compatible.

It is not the 10% that are concerned and aware and that will do the best environmental thing regardless of cost or convenience. It is essential to get significant change to have the majority of consumers who prefer 'convenience' to 'environmental friendly' to change. Manufacturers must develop new environmentally better ways of ensuring preparation that meet current health and safety guidelines while retailers must find creative ways of marketing and non-packaging.

Leading industries are already trying to get a jump on the new markets by promoting to the enlightened group. The Federal Government's Environmental Choice Program is a positive attempt to provide consumers with known choices. It seems, although it's in its infancy, that it is difficult to get it right.

The first three proposed:

1. Re-refined auto motor oil;
2. Insulation materials made of recycled paper; and
3. Selected products made from recycled plastic.

A valiant effort, but as a consumer I would suggest not the stuff that one would drop tools on your home renovation site to rush down in your car, in its recently changed re-refined oil to get recycled paper insulation, so that your recycled plastic coffee table has a place to sit. All at a price that will probably be considerably higher than your customary normal product.

Much long term evaluation of the E.F.P. and environmental choice will have to be undertaken before consumers will have total confidence in 'environmentally labelled' products. But most important the millions and millions of dollars of promotional advertising in all that packaging, to promote what's new, hip, and has sex appeal will have to re-focus on what is environmentally sound.

The advertising, marketing, and packaging industry has got to change. The good first few examples have got to swing to the vast majority of activity. I have every confidence it can happen if public pressure from environmental groups and consumer groups continues to demand change. My concern is that environmental groups and consumer groups can heighten public awareness to fever pitch and there is no infrastructure in place to service the desired change in behaviour.

The most visible example was a recent City of Ottawa program to get people to bring their toxic and hazardous wastes to a weekend pick-up site. Hundreds of people and gallons of consumer hazardous and toxic products had to be turned away because the 1/2 million dollar weekend pick-up was over capacity within a few hours of opening.

Even a prominent city alderman was left holding her paint cans, much to her heightened "public awareness" chagrin. The next tough step was going back to Council on the following Monday and having to vote another 1/2 million dollars for another pick-up not available until the fall. The estimates on costs to do this seem to range from $800 to $1000 for one industrial drum of pick-up. Coincidentally, more than the original cost of the paint and garden sprays being collected, but as important, is how long will consumers wait in line-ups on weekends to dispose their paint cans.

With due respect, it won't be the 'Molson Golden' crowd standing in those lines, and it needs to be, and many others, to get any significant impact. It will only be when that pivotal advertising and marketing line finally gets crossed. That is when it is deemed doable and profitable to have environmentally focussed marketing and advertising that we will see a significant quantitative progress.

The challenge to industrial producers is to start working on the disposal model in the research and development phase. This will have to become a critical part of entry of a product to market. Not just a token headknodding of 'cradle to grave' management of chemicals, but the actual physical costs of proper marketing and disposal built-in to the economics of managing the product.

No longer is it possible to claim it is the governments responsibility for disposal. Local and provincial budgets can't do it alone. Manufacturers must begin to play a leadership role. I believe the consumer will support any reasonable costs associated with this approach. The challenge then is for the consumers groups to work with packaging, waste managers, and industry associations to solve the problem.

Costs will ultimately be borne by the consumer but we are going to be very watchful of any environmental bandwagon price grab that any good marketing department would try and exploit.

The Consumers' Association of Canada, B.C. Chapter has been working with other groups in coalition on Environment Sound Packaging (ESP) program that will be a critical start.

We have had preliminary discussions with the other groups and will continue to look for the most effective place to recommend to our 140,000 members and their networks the most appropriate avenues, products and processes to be good helpful consumers for our environment and planet.

Over the next start period we hope to use the principles of consumer protection and education and translate them into a new consumer code of environmental rights.

These principles could be a good starting point for the manufacturers trying to be more consumer friendly in their products.

Since we are in Manitoba, I would like to quote from CAC Manitoba's, 'It's Your Choice' booklet, as the basis for what will be intrinsic in our consumer code. Consumers Rights include:

The right to be informed,
The right to safety,
The right to redress,
The right to choose,
The right to consumer education, and
The right to be heard.

Consumers responsibilities include:

The responsibility to search out and use available information,
The responsibility to read instructions and take precautions,
The responsibility to fight for the quality you believe you should be receiving,
The responsibility to make your own independent and informed consumer choices,
The responsibility to take advantage of educational opportunities, and
The responsibility to make your own opinions known.

The range of issues that consumers will face with respect to the environment will be immense. Todays toxic issues in imported gasoline, green products, organically grown produce, and oil spills will all be better served by greater numbers of informed consumers who use some of the above mentioned principles and won't tolerate industries, manufacturers, products, and processes that are not to a necessary, current, high level of environmental standards.

These standards, I might add, should be consistent province to province and at the higher level required in the North American marketplace. That part will hurt, but I think consumers, if they have any disposable and discretionary income left after government budgets have devastated them,will pay their fair share.

The challenge to the manufacturing and retail sectors is there. Consumers will play their role.

THE GREEN CONSUMER AND SUSTAINABLE DEVELOPMENT

Mary Granskou

Fundraising Director
Friends of the Earth
#701 - 251 Laurier Avenue West
Ottawa, Ontario K1P 5J6

ABSTRACT

Friends of the Earth is bringing Green Consumer Week to Canada this October. - with the participation of environmental groups, schools, community organizations, retailers and manufacturers. Green Consumer Week will increase environmental awareness and action in Canada, and provide opportunities for Canadians to exercise their environmental concerns in the marketplace and elsewhere.

Green Consumer Week is a response to poll after poll showing that Canadians list environmental protection as a top priority and want to know what can be done to help. This event will give Canadian citizens and businesses concrete suggestions on how they can protect the environment. Displays and public events, organized by a national communications team, will broadcast this message across the country.

Millions of Canadians will join in this environmental action event that is sure to take this country by storm. McClelland and Stewart is publishing The Green Consumer Guide which recommends buying products that "don't cost the earth", as well as how to use and dispose of products responsibly and safely.

Green Consumer Week is an event for people everywhere - such as in stores, offices, schools and at home. It's an opportunity for Canadians in small towns and large cities to think green, act green and shop green.

TITLE: Agriculture Sector
SESSION: B.8
BULLETIN NO.: 21

GREG ARASON

He called for a balanced understanding of the use of chemicals such as pesticides and chemical fertilizers, which are necessary for economic and efficient food production.

Arason described his company's role in promoting the proper use of chemicals, not only for safety and environmental reasons, but in order to maintain confidence in the agricultural industry.

"The attention to product safety and proper utilization is not enough for some members of society", he said. "They would have such products banned completely". He said that the proper use of these products should be seen as environmentally friendly as it reduces erosion and degradation and enhances soil nutrient content.

"We need to dispel the myths and misinformation around modern farming practices," Arason said, giving as an example the concern about estrogen levels in beef from cattle implanted with growth hormones. Arason said there is data indicating that a 100 g portion of cabbage or of peas contains hundreds of times more estrogen than a 100 g portion of implanted beef.

Arason said there is a need to balance food supply security and productivity with the concerns about the impact of crop protection products and that the industry must evolve and adapt rather than face a revolution in farming practice through legislation.

C. FRED BENTLEY

Bentley observed that, "Civilization as it now exists cannot survive unless effective measures to halt adverse environmental effects of agriculture and increasing population are implemented."

He said he was disappointed, that in comments regarding the centre for sustainable development, nothing had been said about agriculture.

"Agriculture is a major contributor to environmental and ecological damage to the earth", he said. "On a per capita basis, Canadians are probably contributing more to a global environmental deterioration than any other nation." Continuing soil degradation in the Prairie Provinces, he claimed, costs hundreds of millions of dollars annually in farm production losses.

Bentley called for long-term, on-farm field scale research experiments on soil and crop management to verify existing research findings.

"The public", he said, "should demand early, effective and adequate actions related to conservation and productivity maintenance of soils by politicians - at all three levels of government".

Government policies were criticized as sometimes encouraging soil degradation. Only subsidies that encourage soil quality maintenance should be allowed to remain, he said.

BOB MCNABB

The most important reason for zero-tillage, said McNabb, is erosion control. "It is a known, documented fact that zero-tillage can reduce soil erosion by 90% over conventional tillage."

Surprisingly, zero-till also reduces the amount of active ingredient of herbicides applied per acre. McNabb cited a study showing 22% less active ingredient for a typical cereal and oilseed crop.

McNabb contended that, "The continuing loss of productive topsoil will ultimately produce far more environmental harm and consumer concern than the present use of herbicides."

Zero-till has also shown favourable net returns. In a study on the Garth Butcher farm at Birtle, Manitoba, three years of data show a net return over expenses per acre of $90 for zero-till, $76 for conventional till, and $86 for minimum till.

Moisture conservation is another important advantage, McNabb said, with zero-tillage providing a form of moisture insurance, especially for germination.

McNabb concluded, "Zero-tillage or conservation tillage can and should be adopted by producers so that the benefits I have discussed can become the cornerstone of the sustainable agriculture we all desire."

DISCUSSION

. Sustainable agriculture needs to be better defined.
. Government programs do not always favor zero-till.

SUSTAINABLE AGRICULTURE
AN AGRI-BUSINESS PERSPECTIVE

G. S. Arason, CEO

Manitoba Pool Elevators
P. O. Box 9800, 220 Portage Avenue
Winnipeg, Manitoba R3C 3K7

Introduction

I am pleased to have the opportunity to address this very important topic during the panel discussions relating to agriculture. My congratulations to the Government of Manitoba and the sponsors and supporters of this conference for putting together a very comprehensive program to address the issues around sustainable development.

There is no doubt that the topics being addressed during these two days are currently of major interest, not only to industry, but to the general public as well. In our industry, there is hardly a magazine, periodical, or newsletter which does not in some way contain reference to these issues. I see this increased awareness as a very positive development. I must add, however, that we do have a concern that these reports are not always balanced or factual and that there is always a temptation to sensationalize and create unwarranted alarm. For example - the cover story in the April/89 issue of "Country Guide" was titled "The Passion and Politics of Sustainable Agriculture". Other recent headlines include "Getting Familiar with LISA" (Broadwater Market Letter); "Alternative Agriculture Gains Ground" (Manitoba Co-operator); "Suzuki Condemns Farmers' Pesticide Use as Short-sighted" (Ontario Farmer); "LISA Emerges as Complex Agricultural Issue" (Cargill Bulletin), and "Solving the Toxic Waste Equation" (World Link Magazine).

In its 1989 Policy Preview & Outlook, the C. D. Howe Institute commented on forces of change in the world economy as follows: "Four major types of change will be important in the 1990's in shaping the policies of the next agenda: environment, technological, and demographic, and changes in the world economic order" 1.)

The report commented specifically on environmental changes as follows:

> "In April 1987, the World Commission on Environment and Development -- an international panel chaired by Norwegian Prime Minister Gro Harlem Brundtland -- published a chilling analysis of environmental trends that threaten to alter the planet radically:
>
> Each year another 6 million hectares of productive dryland turns into worthless desert ... More

> > that 11 million hectares of forests are destroyed yearly ... Much of this forest is converted to low-grade farmland unable to support the farmers who settle it... Acid precipitation kills forests and lakes and damages the artistic and architectural heritage of nations. The burning of fossil fuels puts into the atmosphere carbon dioxide, which is causing gradual global warming. This 'greenhouse effect' may, by early next century, have increased average global temperatures by enough to shift agricultural production areas, raise sea levels to flood coastal cities, and disrupt national economies. Other industrial gases threaten to deplete the planet's protective ozone shield to such an extent that the number of human and animal cancers would rise sharply and the ocean's food chain would be disrupted. Industry and agriculture put toxic substances into the human food chain and into underground water tables beyond reach of cleansing.[1]
>
> While the scientific community continues to debate the implications of these trends, the evidence led the Commission to serve notice that the time has come to take decisive action both domestically and through international institutions, to encourage "sustainable development". This comes from a growing recognition that it is difficult to separate economic from environmental issues. Global poverty, for example, is both a major cause and effect of global environmental problems. Economic development continues to be essential, but to avoid environmental calamity, future development can no longer be allowed to erode the environmental resources on which it must be based.
>
> Since the release of the Brundtland Report, environmental concerns -- particularly those relating to the "greenhouse effect", ozone depletion, and toxic waste -- have increased. In the years ahead, there will be increasing focus on the inter-dependence of environment and the economy. For considerations into private and public-sector decision making. It means creating appropriate incentives to halt and reverse environmental damage caused by acid rain and toxic waste. It means contributing to global environmental projection by taking a leadership role in international councils dealing with environmental issues and by ensuring that Canadian assistance to developing countries supports only projects that meet the test of environmental soundness."

Those kinds of comments make it clear that the issues will have to be addressed. It is also clear that industry and business must deal with environmental concerns or face the prospect of being legislated into dealing with them. This may be especially true in agriculture, where pesticide and chemical use is widespread and of tremendous economic importance and impact.

There is no doubt that companies are being held more accountable for their actions. The accountability is extended to individuals within the company and I am acutely aware of what that means to people in my position. I know where the buck stops and as an example, I noted that the Head of Exxon felt obliged to take out full page ads to clarify their responsibility for the recent Alaskan oil spill disaster.

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[1] World Commission on Environment and Development, Our Common Future, Report to the United Nations General Assembly (Oxford: Oxford University Press, 1987), pp. 2-3.

Manitoba Pool Elevators is in an interesting position when it comes to the environment and agriculture. From a strictly commercial aspect we are the traditional middleman in the chain. We rely on manufacturers and suppliers to provide the products which we then market to producers who are the end users of the product. In that role, we must depend on the manufacturer to provide us with **SAFE** products. Governments, of course, have a major regulatory role in the determination of product safety and approval. We become custodians of the product until it is turned over to the final user. During this interim period, we have a responsibility to ensure that the proper procedures for the storage, handling and transportation of those goods are followed. We have no direct control over the utilization of the products except in the cases where we are directly involved in their custom application. We do have a responsibility to advise producers on proper application procedures but we cannot guarantee full understanding and compliance. I believe we are making considerable progress in this area and that producers are becoming much more conscious of the need for responsible handling, proper application, and safe disposal of residues and containers.

The attention to product safety and proper utilization is obviously not enough for some members of society, they would have such products banned completely. This is where the debate becomes interesting. We are not dealing with shades of grey for some groups and individuals; we are dealing with a black and white issue. In their view, there is no such thing as acceptable risk or tolerance levels other than zero. Even the definition of sustainable agriculture means entirely different things to those on either side of the fence. To some it means no pesticides, no hormones, no chemical fertilizers, no medications, etc. To others it means prudent use of fertilizers and pesticides, effective crop rotations and conservation practices, and the continued economic viability of their farming operations.

A Matter of Risk

Life is a risk. Business is a risk. It is simply not realistic to expect to eliminate risk altogether. We strive to minimize risk, but we also strive to improve, which by definition means changing and accepting some risk. We must recognize that used in excess almost anything, whether naturally produced or not, increases risk to our health.

As an example, consider the debate around the use of hormone implants in beef cattle. To many the idea of using hormones conjures up all kinds of visions of abnormality and health hazards. However, the following comments in a recent issue of the "Broadwater Market Letter" serve to place the issue in a different perspective:

> "Specifically the EEC refers to, among others, products having hormonal action such as estrogen, progesterone and testosterone based products. These three hormones are produced naturally by animals and humans and are required for the natural regulation of the reproductive cycle. The key here is that the rate of natural estrogen production in the human body is so

high that a child would have to eat 10,000 pounds of beef a day to equal his own daily production of estrogen.

Peas are far worse in terms of estrogen than beef as shown in the table below:

Food	Portion	Estrogen*
Cabbage	100g	2,400
Peas	100g	400
Eggs	50-60g	1,750
Milk	500 ml	75
Beef (non-implanted)	100g	1.2
Beef (implanted)	100g	1.9

* These measurements are in nanograms of estrogen per 100 grams. (One nanogram equals one billionth of a gram.)

The daily human estrogen production in nanograms is 40,000 - 90,000 for a child, 480 000 for a non-pregnant adult female and 130 000 for adult males.

Beef, in terms of estrogen, a common hormone produced by both humans and the bovine species, is not a health risk even when used as a growth promotant, and if it were, peas and cabbage would present an even greater potential risk." 2.)

We need to tell the real story. We need to allay the fears of the general public. Most of all, we need to use these products responsibly. One incident of abuse can undo much of the progress we are making when presented to a public which is skeptical at best, and openly hostile in many cases.

We strongly support the efforts of the Crop Protection Institute of Canada to promote proper use of pesticides and provide accurate information to the general public. We also support specific programs such as proper disposal methods for pesticide containers and residues.

Matter of Choice

Nostalgia is a wonderful thing. We tend to long for the "good old days" when life was simpler and we did not rely on technology as we do today. But technology has improved our lives and our ability to survive in what at times is a hostile environment. Current farming practices are much more kind to the land than those of the 1930's. Our ability to manage our land resources during the drought of

1988 (hopefully not 1988/89) is in stark contrast to the images we have seen of conditions in the 1930's. We cannot control nature but we can prepare for the difficulties nature presents.

One of the very real choices we have to make from time to time is whether or not we produce our crops for consumption by humans or insects. In colder climates, this tends to be a less serious problem. In the more temperate climates it is an ongoing question. In many countries, stored grain is routinely treated to control infestation. In Canada, we treat on an exception basis, when infestation is evident we deal with it. In less fortunate areas of the world, there really is no choice for those who are starving or facing food supply problems. The risk of tainted food must pale somewhat when compared to the possibility of starvation. That is not to say that we should ignore these issues in the Third World, but we must recognize that they need every advantage in their efforts to survive.

In the developed economies the choice becomes much different. We are now seeing a growing number of consumers who are willing to pay for "natural food". This includes food free from additives and preservatives as well as food produced without the benefit of chemicals or pesticides. Food producers will respond to this demand provided that the price reflects the added cost of production and maintaining separation in the food distribution chain. I have no concerns about this, we need to be sensitive to the demands of the market. My only concern is that a reverse psychology may set in -- by producing so-called "safe food" for consumers, they may perceive that food produced by other means is "unsafe". We cannot afford to let this impression detract from our efforts to produce food economically and responsibly.

Concluding Comments

Once again, I must commend the organizers of this and similar conferences. We must continue to address these issues and create more understanding and awareness on all sides.

In summary I would emphasize the following:

- The use of pesticides and chemical fertilizers is necessary for economic and efficient food production.

- The proper use of these products is extremely important not only for safety and environmental reasons, but in order to maintain confidence in our industry.

- The proper use of these products should be seen as friendly to the environment as it reduces land erosion and degradation and enhances soil nutrient content.

- We need to dispel the myths and misinformation around modern farming practices.

- We need to balance the need for food supply security and productivity with the concerns related to the impact of crop protection products.

- We must continue to evolve and adapt in our industry, rather than be faced with a revolution in farming practice forced upon us if we do not act responsibly, or properly inform the public of the facts about modern agricultural practices.

I look forward to the comments and discussion to follow.

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1) Ottawa's Next Agenda - Policy Review and Outlook 1989 (C.D.Howe Institute, February 1989) pp. 767-77

2) Broadwater Market Letter, March 31, 1989

SUSTAINABLE AGRICULTURE

C. F. Bentley

Professor Emeritus of Soil Science, University of Alberta
13103-66 Avenue
Edmonton, Alberta T6H 1Y6

Agriculture began about 10,000 years ago and the 5,000-fold increase in human population during that period is primarily due to that historic innovation. Globally, current civilization is gravely threatened by environmental degradation caused by human numbers and their activities. Although there is now some long-overdue realization of the extent and likely effects of environmental deterioration worldwide, remedial actions by citizens and governments are, to date, utterly inadequate to reverse the escalating adverse effects.

Agriculture is a major contributor to environmental and ecological damage to the earth. Canadian agriculture is no exception to that statement. The extent of the global impairment is horrendous. Annually, "irreversible desertification claims an estimated 6 million hectares worldwide, and an additional 20 million hectares become so impoverished that they are unprofitable to farm or graze" (Brown et al. 1989). The combined total of 16 million hectares per year is more than 60 percent of the total area under cultivation in the Prairie Provinces. Other Worldwatch Institute reports, "Our common future" (Report of the Brundtland World Commission on 'Sustainable Development'), and the 1977 report of the United Nations Environment Program (UNEP) conference on desertification are sources of extensive details regarding environmental degradation resulting from agricultural activities.

Civilization as it now exists cannot survive unless effective measures to halt and reverse adverse environmental effects of agriculture and of increasing population are implemented. Canadian smugness and ignorance does not generally recognize that on a per capita basis, Canadians are probably contributing more to global environmental deterioration than any other nation.

Let me now focus on agriculture in the Prairie Provinces and deterioration of farmed lands here, --- which currently contributes half of Canada's agricultural production.

The Prairie Farm Rehabilitation Administration (PFRA) is a 50-year-old Government of Canada agency which was created to rehabilitate degraded agricultural lands in the Prairie Provinces. A 1983 PFRA publication, entitled "Land degradation and soil conservation issues on the Canadian Prairies", documented the massive nature, costs and effects of continuing soil deterioration in the region which annually cost hundreds of millions of dollars in farm production losses alone.

An Alberta Agriculture publication, "Conservation Tillage Survey of 1987" (by Tom Jensen), establishes that extremely unsatisfactory conditions apply with respect to soil conservation as well as soil and crop management practices on a majority of Alberta Farms. (I have no reason to think conditions are consequently better in Saskatchewan or Manitoba.)

Some selected highlights from the Alberta survey based on over 500 responses to a very extensive questionnaire include:

* Less than half of Alberta farmers practice any form of conservation tillage (i.e., more than half practice clean bare tillage for production of arable crops).

* The lower cost of traditional tillage, compared to more conserving types of tillage which make some use of herbicides is the major reason for the limited adoption of "conservation" types of tillage.

Fuel tax rebates to farmers are an encouragement to some farmers for unnecessary and undesirable tillage.

Half of the responding farmers said there is need for improved soil conservation to maintain soil productivity.

* Both conventional tillage users and conservation tillage users lacked specific data regarding the effects of conservation tillage practices on net farm income.

* Major perceived (not measured) advantages of conservation tillage were:
- increase in soil organic matter;
- moisture conservation;
- improved soil tilth;
- soil erosion control; and
- increased net farm income.

* Summerfallowing is still practiced on 58 percent of Alberta's cropped land.

* Crop insurance benefits encourage some farmers to fallow.

* Only 13 percent of respondents reported inclusion of forages in cropping system used.

* Fifty percent of respondents thought yields will decrease quite a bit in the next 10 to 20 years unless soil erosion control is improved.

* The respondents rated maintaining plant cover or crop residues as the most effective methods of erosion prevention.

* The most highly rated sources of information were rather poorly used.

* Most farmers were generally unaware of the requirements of the Soil Conservation Act.

* Preferred incentive programs to encourage soil conservation were:
  - subsidize herbicides:
  - funds for on-farm experiments and demonstrations;
  - reduce crop insurance premiums for those who practice soil conservation;
  - provide tax allowances for purchases of soil conserving equipment; and
  - pay per acre rewards for use of conservation practices.

Because of time limitations for this presentation, the following brief, sometimes cryptic, opinions are recorded.

* Despite all the rhetoric of politicians about their concerns for the environment, soil conservation and maintenance of soil productivity are disgracefully neglected in spite of their importance to the nation.

* The federal government has repeatedly failed to fulfill specific promises related to soil conservation in the Prairies.

Intergovernmental jockeying for positions or credits do no credit to the federal and provincial governments concerned.

* For the Prairie Provinces, there exists, much of it buried in files, results of a great deal of soil and crop management research (particularly crop rotation research) which has never been adequately validated and evaluated by long-term, on-farm, field-scale research.

Effective assessments of the recommendations from that research, especially realistic economic determinations, are of fundamental importance to reversing the continuing degradation of most farmed land in the Prairie Provinces.

Causes responsible for the deplorable state of soil and crop management practices which are essential to long-term sustainable agriculture in the Prairie Provinces include:

* bad agricultural policies of governments; --- particularly some subsidies which encourage soil degradation; --- and the failure to tie subsidies to soil and environment protecting or enhancing practices;

* urban residents who: demand cheap food; in ignorance, rail against agricultural chemicals; and who fail to demand that governments fund adequately agricultural programs related to soil-maintaining and environment-protecting activities;

* the general society which currently exhibits unreasonable unwillingness to apply meaningful discipline when it is clearly warranted.

To be positive and constructive, as well as to spark debate, I offer some proposals for actions which I believe would attain sustainable agriculture in the Prairie Provinces if effectively implemented and maintained.

* The public --- all ranks and kinds of citizens --- should demand early, effective, adequate actions related to conservation and productivity maintenance of soils by politicians --- at all three levels of government.

* Discontinue all subsidies to agriculture which encourage or reward environmentally unfriendly or soil degrading farming practices.

* Limit almost all agricultural subsidies to incentive programs which encourage and assist soil quality maintenance (or enhancement) and are also protective of the environment.

* Institute a massive long-term, on-farm, field-scale program of research experiments to compare and evaluate rigorously recommended soil and crop management, and crop rotation, practices against current farmer practices.

* Establish programs to educate practically and professionally qualified soil conservation agronomists.

* Assess full damage correction costs to properties which cause inexcusable erosion related to damage to others.

* Increase assistance programs to get ineffective operators out of farming.

My forthright expressions of opinion should not be construed as castigating all farmers. Although there are many farmers who are maintaining or enhancing the productivity of their lands, they are a minority in the Prairie Provinces. Canada clearly lags far behind the United States and some other countries in effective programs to protect and maintain or enhance the productivity of farmed lands --- the most valuable natural resources of a nation.

If Canada does not improve its performance in these matters, what hope is there for sustainability of the productivity of agricultural lands on a global basis?

Reference

Brown, L. R. et al. 1989. State of the world, 1989. W. W. Norton and Co., New York, N. Y.

ZERO-TILLAGE - ENVIRONMENTAL AND ECONOMIC IMPACTS

Robert McNabb

Box 1364
Minnedosa, Manitoba R0J 1E0

Sustainable agricultural development, environmental impact concerns and economic agricultural viability are all partners for the future development of worldwide agriculture.

Serious consideration of these partners is long overdue and I am certain that appropriate strategies can be formulated through consultation with all sectors of society.

I would like to share with you some of my observations from a farmer's view on why and how I see the zero-tillage system of crop production complementing the future development of worldwide agriculture.

After a decade of zero-tillage farming, I can confidently say to you that, "there is life after tillage".

I will attempt to explore some of the reasons we produce in the no-till manner; however, I believe it is appropriate to indicate what I consider to be zero-tillage.

My definition of zero-till is one that retains as much standing stubble and surface residue as possible. We do not rely on any tillage to control weeds. I prefer to substitute herbicides, particularly herbicides of negligible residue or carryover, for tillage.

My present continuous cropping system producing cereal, oilseed and legume crops involves the use of fall banding of liquid fertilizer (N, P, K and S) with surface soil disturbance of .6" in a 12" width. The seeding process has been dramatically improved with the use of a high clearance hoe-press drill. The seeding results in disturbance of 1.25" of soil in 8" of width. This results in a total soil surface disturbance of approximately 20% in one complete production cycle. At no time do I expect this amount of disturbance to provide any form of weed control.

We have changed our original ideas on disturbance from one of desiring no disturbance, (i.e. perfect zero-tillage) to one that encompasses the best placement of N, P, K, S for cost-effective utilization and a seeding system that puts every seed into the ultimate seed-soil environment for rapid, even germination.

The following headings will be discussed to substantiate "Why Zero-Till".

1. Erosion Control
2. Moisture Conservation
3. Off-site Erosion Costs
4. Responsible Herbicide Use
5. Energy Conservation
6. Equipment - Size and Maintenance; Time and Labor
7. Weed Control and Alternate Cropping Programs
8. Marginal Land Use and Wildlife Habitat
9. Compaction and Earthworms
10. Economics and Soil Stewardship

1. Erosion Control:

When we started zero tillage, we were motivated by the prospect of reduced input costs. Within three years we began to recognize and appreciate the definite decline in soil loss from wind and water erosion.

Studies from around the world have shown that the cause of soil erosion is a lack of protection on the soil surface.

Jim McCutcheon summed up the situation best in saying, "The culprit robbing this protection from the soil surface is tillage". The solution is to reduce or eliminate tillage in order to retain natural protection on the soil surface. This is the number one reason for zero-tillage. It is a known, documented fact that zero-tillage can reduce soil erosion by 90% over conventional tillage. The annual cost to farmers of soil erosion was estimated at one billion dollars in 1984. This loss does not have to occur and in my opinion should not be allowed to occur.

2. Moisture Conservation:

I look at zero-tillage as a form of insurance. I know that I will have adequate moisture for germination, something that the last few years have not always guaranteed a conventional farmer.

"WATER IS AN ABSOLUTE VITAL LIQUID ASSET"

Dryland farming depends heavily on nature for success. Absolute control of nature is, of course, impossible; however, through the snow trapped in standing stubble, better infiltration of surface water and the reduction of surface evaporation, I can be assured that I have removed some of the risk of the farm business. The past year has shown that water is one of the most valuable assets a farmer needs.

3. Off-site Erosion Costs:

In Canada, there is no estimate of off-site costs of soil erosion but in the United States, off-site cost is estimated to be at least three times larger than on-site cost. If this is applicable in Canada, the off-site cost could therefore be in excess of three billion dollars annually.

One severe off-site consequence of erosion is the deposition of soil in water reserves, lakes and wildlife habitat. When this soil leaves the conventional farm, it carries with it fertilizers and pesticides which pose an environmental concern, which in my opinion will eventually not be tolerated. Conventional farming with the use of tillage and soil-incorporated herbicides will be monitored closely for its effect on water quality.

The severe deposition of soil this past winter in some areas of Manitoba was abundantly evident; however, the most interesting observed aspect was that it did not require a great deal of crop residue on the soil surface to significantly reduce this loss. Zero-tillage is the most effective and responsible production system preventing this type of environmental concern.

The short term costs of erosion in having to reseed because of wind erosion cutting young plants off or burial of the crop can be significant. Reseeding costs of $15.00 per acre can be avoided.

4. Responsible Herbicide Use:

While we are talking of environmental concerns, we must address the perceived notion by many people that zero-tillage, with its substitution of herbicides for tillage, results in the higher use of herbicides. In actual fact, in our area of Manitoba and indeed much of the prairies, zero-tillage results in the application of less active ingredient of herbicides applied per acre than conventional till. Data compiled by Robert Stevenson, indicates that the zero-tillage system utilized 22% less active ingredient per acre for the production of a typical cereal and oilseed crop.

Zero-tillage will perhaps utilize four applications of post-emergence herbicides, all of low residual activity. Conventional tillage methods utilizing soil-incorporated herbicides at required higher concentrations of residual herbicides will result in a higher herbicide rate per acre. Consequently, the risk of non-target contamination because of erosion becomes a definite factor.

The judicious use of pesticides is critical to all production systems; however, the quantity and residual characteristics of those employed in zero-tillage have a positive environmental effect in comparison to conventional tillage systems.

The environmental concerns expressed by some about the use of pesticides, is an alarming issue. There is a perceived fear that man-made pesticides will harm our environment. This fear is based on a lack of facts. A simple view of the lethal dose value of nicotine, caffeine and table salt indicate that they are several times more lethal than the herbicides I employ.

I contend that the continuing loss of productive topsoil will ultimately produce far more environmental harm and consumer concern than the present use of herbicides.

5. Energy Conservation:

This area is often not factored significantly in tillage comparisons. Too often we tend to think that we have an abundant and economical source of energy when in fact Canada's and the United States' record with respect to energy has several unfavorable aspects.

1. Production potential from proven reserves of conventional oil at present rate of extraction is only 12 years.

2. Per capita usage of energy is higher in Canada than in the U.S., USSR, Japan or China.

3. The cost of oil is second only to the U.S.

4. Achievements in energy conservation are the poorest of all other industrialized countries.

This indicates that we have yet to take our energy utilization seriously and when prices rise, which they inevitably will do - production techniques which employ tillage will come under scrutiny.

Our fuel consumption for all farm purposes costs approximately $4.50/acre while the Manitoba Department of agriculture budgets fuel costs for 1989 of $9.00/acre.

6. Equipment, Size, Maintenance: Time and Labor

I realize that this topic varies from farm to farm; however we have cut the hours per year on the main tractor by one-half. When you consider that the engine is operating in less dust, the engine lifetime expectancy is increased as well as the lifetime expectancy of the machine itself.

Size of equipment for zero-tillage has not changed a great deal in our operation; however we could farm our present acreage with probably 50 less horse power in our main tractor. One area that less time is allocated for is stone picking. This aspect can only be appreciated by those familiar with the consequences of rocks.

Ten years ago the availability of suitable equipment was a limiting factor for zero-tillage; however suitable equipment is now available at a comparable cost to conventional equipment.

7. Weed Control and Alternate Cropping Programs:

After ten years in zero-tillage my weed problems are no greater than any of my conventional neighbors and I firmly believe that with a significant reduction in the cost of glyphosate, I expect to enhance my weed control.

There is nothing that provides better weed control than a healthy, rapidly growing crop - zero-tillage has always provided the commencement of such a crop.

The possible utilization of Roundup for desiccation in cereal and oilseed crops would be a tremendous complement for weed control in zero-tillage.

Zero-tillage can provide alternate cropping programs, diversifying the cropping system. We have established successful crops of winter wheat and this year we will be evaluating fall rye and an experimental plot of winter canola. Fall seeded crops provide excellent soil cover and utilize the early spring moisture more efficiently. This is an area that could and should expand given suitable varieties. Zero-tillage adds a degree of insurance to this program.

8. Marginal Land and Wildlife Habitat:

Much has been said about the cultivation of marginal land in Canada and the need for developing a conservation reserve program perhaps similar to that of the United States 1985 farm bill.

Certainly a reduction in productive capacity in times of excess capacity is a rational approach. There are undoubtedly, a percentage of cultivated lands in every province and state which should be permanently placed in a vegetative cover. This should be contemplated with wildlife management and probably include some of the more productive soils as well.

Soil and water conservation are complementary to the survival of appropriate wildlife habitat.

I recently observed an interesting article on the December 1988 issue of "Agribusiness Worldwide". Sparks Commodities Inc. of Memphis, Tennessee released its 1988 World Study update, a 110-year look at world agricultures alternative futures. Selected highlights were as follows:

Feed Grains - During the next 10 years, feed grain demand will begin to exceed available supplies resulting in a slow draw-down in stocks. The rest of the world will become very dependent on the United States, Canada and Western Europe to meet expanding feed grain needs.

Wheat - After a rapid build up in wheat stocks during the first half of the 1980's, stocks will be pulled to very low levels as the world advances toward 1990. Wheat supplies will make up for potentially short rice supplies in the world's most rapidly growing population centers.

Oilseeds - The soybean meal percentage share of expanding world protein demand could decline unless the U.S. Department of Agriculture alters programs that discourage soybean planting. The alternative is prices high enough to stimulate larger than anticipated South American area expansion. Like soybean meal, soybean oil is expected to be left with a shrinking share of the increasing world oil demand. The largest increase is expected in palm oil followed by the oils of high yielding oilseeds such as sunflowers and oilseed rape.

Rice - The rice-producing countries will have extreme difficulties in meeting rising world rice demand over the next 10 years. S.C.I. forecasts a rice shortfall over the next decade, which will be exacerbated by the relatively low level of world rice stocks.

In view of this scenario, an ever increasing population and the uncertainty of yearly global production, the best method of managing marginal land production is to simply change the production methods presently in use. Zero-tillage could maintain and enhance the productive capacity of a large portion of marginal land while reducing the degradation of these soils and contributing significantly to world demands and the country's economy.

Farmers simply require the financial incentive to facilitate such changes in production.

Given such incentives, cross compliance aspects could be avoided in a conservation program. Without such incentives, I am sure that future policy makers, not farmers, will eventually be forced to regulate land use for the protection of soil, water and wildlife.

9. Compaction and Earthworms:

One of the myths about zero-tillage is that the fields will become hard. In actual fact, the opposite has occurred. Our fields have become mellower and soil tilth improved.

I am not knowledgeable enough to comment on subsoil compaction; however, I was intrigued by a Science Council of Canada report in 1987 which estimated production losses from soil acidification, compaction and erosion in central and eastern Canada. Losses due to compaction were estimated to exceed the combined losses due to acidification and erosion by 25 percent. The more frequent field operations for tillage purposes could conceivably increase, the likelihood of compaction.

I am of the opinion that subsoil compaction in zero-tillage actually decreases because of the earthworm activity that becomes evident after a few years of no-till. Large populations of earthworms and anthropods usually become established after just a few years. The earthworm holes allow for better water infiltration and deeper root penetration. Research in the U.S. has shown that in conventional tilled conditions due to greater compaction and the lack of earthworm holes rainfall takes up to 10 times longer to soak in. A thunderstorm can therefore provide sudden moisture which will run off before it has a chance to soak in. This again results in surface soil, fertilizer and chemical loss.

Root systems of crops will follow worm burrows as well as old root channels from previous crops, to a depth of six feet - much further down than in conventional tillage.

In a drought year, roots that can penetrate to deeper layers, earlier in the season are able to tap into soil moisture reserves not available to root systems confined to layers closer to the surface, therefore, the yield potential increases.

Earthworms also help to assist microorganisms in breaking down surface residues and metabolizing any pesticide residues in the soil.

It has been a satisfying and rewarding experience to witness the increasing presence of earthworms in zero-tillage.

10. Economics and Soil Stewardship:

As always, dollars and cents and economics play a significant role in any decision making process.

P.W. Bauder from Montana State University presented some revealing costs of erosion to the 1988 Canadian Soil Science Society meeting in Calgary.

Not only does it cost the landowner; it costs society to clean up and repair. Furthermore, it costs society for clean water and air and costs landowners and producers in the following ways.

1. Higher fertilizer costs
2. Higher fuel costs
3. Lower yields

Erosion costs the farmer directly and indirectly. It removes topsoil, causing more subsoil to be mixed with the topsoil. Subsoil is usually:

1. higher in clay content
2. lower in available water holding capacity
3. lower in fertilizer status
4. less stable in soil structure
5. lower in organic matter content
6. lower in cation exchange capacity

So what is soil loss worth?

The potential loss can be as much as 10% in assets and potential profitability as a result of a 5 tons per acre soil loss. Erosion greater than 5 tons per acre will eventually result in significant reductions in productivity in many soils in the Northern Great Plains. U.S.D.A. has proposed an acceptable maximum loss of 5 tons per acre per year; however recent publications in Canada suggest a much lower acceptable value. Most of the recent studies in Saskatchewan indicate that at least 50% of the landscape experiences erosion rates well over 5 tons/acre/year.

In summary, costs that may seem economically justifiable today are likely to be unacceptable in a century when cropland soil depths will be diminished by an additional 4 to 6 inches or more. (Johnson - Soil loss tolerance - 1987.)

Closer to home, the Manitoba Department of Agriculture under the direction of Owen Beever, agronomist for the South-West Manitoba region, has recently completed three years of a four year study on the farm of Garth Butcher in Birtle. This study evaluated field scale economics of zero-tillage vs. conventional tillage and provides the following data.

Average of 3 yrs	**0-Till**	**Conventional Till**	**Min. Till**
Yield (bus/acre)	70.13	61.46	65.60
Expenses ($/acre)	183.70	75.43	77.53
Gross return ($/acre)	173.36	151.48	163.88
Net return ($/acre)	89.65	76.04	85.68

'86 crop - durum wheat @ $2.70/bus.
'87 crop - barley @ $2.18/bus
'88 crop - barley @ $2.60/bus

Plant counts per square meter have been 10% higher in zero-till.
Residue cover averaged 70% with zero-till following seeding, 43% with conventional and 57% with minimum till.

This data substantiates that zero-till can produce that increased yield resulting in the highest net return.

I hope that the foregoing information will provide sufficient information for many farmers to consider a change in their production system.

In conclusion, I maintain that zero-tillage can and should be adopted by producers so that the benefits I have discussed can become the cornerstone of the sustainable agriculture we all desire.

TITLE: Keynote Address
SESSION: Friday 9 a.m.
BULLETIN NO.: 22

DR. EMIL SALIM, Indonesia Minister of Population and Environment, defined sustainable development as economic development that is to be sustained over a long, trans-generational period. It is affected by environmental and population factors as well as by political and socio-cultural objectives.

"The implementation of sustainable development requires the integration of environmental factors into the development process," said Salim. He proposed a reassessment of economic and ecological principles as a first step in formulating a new framework or policy for joint and concerted action in a national and international context. "Those policies are to be directed towards: managing the stock of natural resources in the best possible way and within the limits of their renewability; managing and enhancing the quality of the environment, including the management of environmental impacts; and, managing the constantly changing relations between environmental and population factors as these affect development options," he said.

The next step, said Salim, would be to apply standard practices of economic analysis to those policies. "This should be carried out in the context of micro- as well as macro-economic analysis, namely balance of payments, capital accounts, budget revenues and expenditures, and regional development," he said. Concomitant to this process is the need for new tools of analysis as well as a new data base, Salim added. "A major tool would be the routine appraisal of the nation's wealth as it is affected by resource depletion rates," said Salim. "Such an appraisal would complement the usual measures of economic processes and production levels."

Salim noted that the pursuit of sustainable development is difficult enough a task under the best of conditions, but it will be even more difficult for developing countries. He stressed the need for an increase in international cooperation. "Separately, development activities and environmental efforts require international cooperation and the integration of environment and development would need even more cooperation," he said.

The needed cooperation pertains not only to transfers of capital and technology, said Salim, but also to trade provisions between countries. "For instance, there are more barriers affecting the trade of semi-processed and processed lumber in comparison to raw lumber. This encourages the export of unprocessed timber at the expense of processed wood products," he said.

Other problems include the lopsided relations of interdependence between industrial and developing nations as well as the emergence of global environmental problems with more serious impacts upon the developing countries. "But overshadowing all this is the phenomenon of economic globalization," said Salim. "Supra-national economic activities are now beyond the managing capabilities of individual nations acting on their own."

The twin phenomena of environmental and economic globalization--and the high potential of negative impacts that they contain--should be seen as warnings, said Salim. "We are being warned that the adaptive capabilities of the globe as an ecosystem are being seriously strained; that the adaptive capabilities of the globe as an economic and a social system are under similar strains," he said.

It is not enough to direct our efforts at preventing or overcoming environmental damages, said Salim. "Nor would it be enough if global cooperation were directed towards mitigating human suffering through doles of charity that pass as technical assistance and foreign aid," he said.

"What is needed is a concerted effort to nurture the earth's adaptive capabilities, to sustain it as a life-support system and to develop new patterns of economic relations within the structures of human interaction," said Salim.

"Moreover, we should also consider the impact of development and economic policies upon our population and the social environment in which they live," he said. "In the end, development will only be sustainable if social organizations and social integration can be sustained."

SUSTAINABLE DEVELOPMENT: SHIFTING ECONOMIC THRESHOLDS

Emil Salim

Minister of Population and Environment
Government of Indonesia
Djakarta, Indonesia

Introduction

At the core of sustainable development is the need to integrate environmental factors into the processes of development. This has both theoretical and practical consequences and the implementation of such an integration has been much more difficult than it originally seemed.

In practical terms, integration would require considerable changes in national priority setting, in budgetary allocations and in development planning in general. It would also need an adequate environmental data base while in operational terms, the implementation of sustainable development would require newly trained and skilled manpower.

In terms of theoretical analysis there are other problems. It is difficult for ecologists to identify environmental factors in terms (including terms of quantification) that would facilitate the internalization of those factors into economic analysis. To be able to do so, ecologists would need considerable help from the economists. But economists have generally been reluctant to extend such help and have largely remained at the periphery of efforts conceptualizing sustainable development, integrating economics and ecology. This, among others, is because of their continuing preoccupation with the huge array of development problems that economists have to deal with.

What is needed now is an assessment of both economic and ecological principles that up to now are being routinely applied in separate ways. In addition to economists and ecologists, other scientists should participate in that assessment in view of the extraordinary range of development and environment, separately and as an integrated whole. That assessment is to lead to a new framework of reference that would form a renewed base for joint and concerted action implementing sustainable development.

To some extent, renewing a framework or terms of reference to underlie operating principles is nothing new to economists because of the very nature of the discipline of economics. More than any of the other social sciences, economics has always been oriented towards affecting public policy. For that reason, more than the other social sciences, economics had to develop along two paths simultaneously. It had to develop as an explanatory science and as a guide for practical action: as a theory and as a praxiology.

As such, economics has been confronted with changing realities, changing views and ideologies and changing public policies. For instance, they had to cope with the emergence of Marxism and its concomitant of centrally planned economies. To understand this new phenomenon economists had to reconsider their earlier liberal premises. Earlier, and in another instance, economists had to come to grips in theoretical and in practical terms with the emergence of colonialism and imperialism and this, too, required them to change their premises.

Such a change of premises is evident in the emergence of concepts of a free-market economy, a planned economy, a mixed economy, and so on. In another context, there were such terms as modern economies as opposed to traditional economies, colonial economies and dual economies. Now, as economists try to deal with the economies of the developing countries with their extensive range of socio-economic disparities and equally extensive hierarchies of needs and demands, there are phrases such as development economics, liberation economics and so on.

Today we must reconsider once again our terms of reference and our premises with the emergence of the concern for the environment in a national as well as in the international context. It is this realization that has led to the advocacy of sustainable development.

The Starting Point

As we make our reassessment, a convenient starting point would be to take development in its original and simplified sense of the optimal use of resources to achieve economic growth. We must realize, however, that in the course of the year various connotations have become attached to the word "development" in addition to the phrase "economic growth." Depending upon one's normative vantage point, development has now also come to connote various desirable objectives such as democratization, the fulfillment of basic needs, the fullest realization of human potential, and so on.

To the term development in its various and divergent connotations has now been added the phrase "sustainable." In its simplest sense that phrase can be taken to merely refer to a time or temporal dimension, namely that development must endure over an extended period of time. That period must, at least, span several generations because one of the motivations in developing the concept of sustainable development is our sense of responsibility towards future generations.

In a more complex sense the term sustainable development connotes not only a temporal dimension but also the other objectives that we have attached to development. As an example, when we take into consideration the development objectives that we pursue in Indonesia, sustainable development can be considered to mean economic development which in addition:

1. Will heed resource availability and sustainability so that renewable resources are utilized within the limits of their respective levels or renewability and non-renewable resources are used in the most prudent way.

2. Will maintain and, to the extent possible, improve the quality of the environment.

3. Will prevent, mitigate or otherwise manage environmental impacts, namely the impacts of natural phenomena, upon the physical and social environment.

4. Will take into consideration population factors especially those that are connected to population dynamics and to other characteristics such levels of skills and of education, productivity levels and problems of social integration.

5. Will pursue other objectives such as equity which implies the best possible income distribution and also the best possible spatial distribution of the quality of life with special attention directed towards the vulnerable segments of the population.

6. Will ensure the greatest possible participation in the development process which requires that access to information and to opportunities be expanded continuously.

All of those listed objectives pertain to economic processes and to production functions. Resource factors and the need to maintain certain levels of environmental quality refer to the supply aspect of economic processes. Population factors pertain to aspects of economic demands while population qualities or characteristics affect production functions. The other objectives of equity and of participation refer to social benefits that are to be pursued, and so on.

To generalize, in view of the foregoing, sustainable development is economic development as it is affected by environmental and population factors and other political and socio-cultural given. These factors, by experts in those fields together with economists, must now be articulated in such a way that they can be accommodated into a model for the economic management of sustainable development.

Inputs for the Economist

To the economists, the environmental expert or ecologist should provide information:

- the conditions of natural resources and trends of change in those conditions,
- the state of environmental quality and trends of change, including information and trends concerning environmental impacts and their magnitude.

In general terms, the major contribution of the environmentalist would be the measurement of how much human intervention the environment can bear in order that agreed upon levels of environmental quality can be maintained and in order that the levels of resource availability can be sustained or properly husbanded. Those levels are determined by what would be required for the environment to perform its ecosystem functions and by what would be required for human well being. These levels are to be observed in addition to levels of resource-renewability.

Together with the environmentalist, the economist could then analyze the impact of economic policies upon the environment and on the sustainability of natural resources. All of this is to help the economist to recognize the ceilings of resource utilization and of development efforts. Also, the ceilings of the negative impacts that he would cause.

It cannot be sufficiently stressed that those ceilings are not absolute as they can be moved or extended through improving efficiency, the application of better technology and skills, and the development of substitutes for endangered resources. As a matter of fact, the key to the economic management of sustainable development is the constant effort to enlarge the parameters of economic and development activities, the constant effort to shift and adjust the economic thresholds.

The inputs of the population expert or demographer would include:

- Information on the quantitative aspects of the population,
- population dynamic and aspects of population mobility, both social, vertical mobility and horizontal, spatial mobility.

As mentioned earlier, this information pertains to the demand aspect of the economy as well as to production functions. Population factors are certainly not unfamiliar to economists. In general, however, those factors have tended to be taken as given, as prevailing realities to which economic adjustments were to be make. But even so, the interaction between population and the economy has always been recognized. To that recognition should now be added the realization that taken together, population and environment factors determine the ceilings of economic endeavors as was mentioned earlier. Parenthetically, those combined interactions find expression in the concept of carrying capacity.

There is still another aspect to the issue of population namely the aspect of the quality of life and its equitable distribution, spatially and vertically. Moreover, we should also consider the impact of development and economic policies upon our population and the social environment in which they live. In the end, development will only be sustainable if social organizations and social integration can be sustained.

The contributions of other academic disciplines to the economist concerned with sustainable development would depend upon the development objectives which, in addition to economic objectives, have been adopted by society. The common task would be to identify as clearly as possible the interdependence between those objectives and economics, population and environment.

All the information and inputs discussed above form the basis for formulating sustainable development policies and the economist's task is the analysis of the economic aspects underlying such policies. In general those policies are to be directed towards:

- managing the stock of natural resources in the best possible way and within the limits of their renewability.

- managing and enhancing the quality of the environment, including the management of environmental impacts.
- managing the constantly changing relations between environmental and population factors as these affect development options.

Managing the resources means balancing resource depletion and resource renewal. The costs of resource renewal should now be part of economic cost-benefit analysis and pricing policies. The management of the quality of the environment and particularly environmental impact management would also require new approaches towards the cost-benefits analysis. For instance, although the formulation of an environmental impact analysis for a particular project of production activity would mean an extra expenditure, that expenditure could also be considered a premium to ensure that activities can be continued in an economic manner over a long period.

All of those economic calculations, of which only a few have been mentioned here, in the end bear upon the exercise which constitutes the operational heart of sustainable development, namely the continuous assessment of the constantly changing relations between factors of environment, population and development. From that assessment comes the recognition of the ceilings that must be observed in carrying out development efforts and that assessment will also identify the needed steps that are to be taken in order to shift those ceilings. In brief, it is from that assessment that development options can be recognized.

From the foregoing it should be clear that for the purpose of economic management of sustainable development present economic tools can be readily applied provided their use is adjusted to the context of a longer time frame. Economic analysis must now be conducted in the context of a time frame spanning generations. Certainly in the context of resource utilization such a longer time frame is essential.

Economists must also collaborate with ecologists in trying to facilitate the internalization of environment factors into economic analysis. For this purpose new ways to calculate how externalities can be recovered need to be developed. The growing scarcity of erstwhile so-called free goods, as in the case of water, will help in this process and so will legally establish environmental quality standards, emission standards and other restrictions on waste and waste disposal. But externalities that pertain to factors connected to common resources such as, for instance, air pollution of the open seas, ozone depletion and other aspects of climate change are much more difficult to deal with. Their recovery would require government intervention in terms of levies and other fiscal means.

There are other economic tools that need to be developed in the area of micro as well as macro-economics. In the latter context, for instance, there is the need for the routine assessment of a country's wealth, based on the calculation of the depletion rates of its key natural resources. These assessments should be made a routine addendum to the standard measurements of a nation's productive output.

Other Economic Measures

In recapitulation, in economic terms the problem at hand is how to obtain optimal value from natural resource utilization while ensuring the sustainability of investments in various sectors and safeguarding the quality of life of the population, distributed in the most equitable way. The last aspect, in a country like Indonesia with its vast territory and plural society, is of great importance so that regional development is a policy priority.

For most developing countries it appears that the most important means for development and for sustainable development even more so are macro-policy means especially those involving financial and fiscal policies. Through such policies it is possible to steer towards more efficient utilization of particular provincial economies into preferred directions. Those policies should also facilitate environmental management and environmental protection as well as manage intersectoral competition.

While waiting for the further development of economic tools of the type indicated earlier, the existing arsenal of tools with the traditional macro-policy framework can be applied. The elements of that framework:

- balance of payments, with special reference to trade.
- capital account
- budget revenues as derived from taxation and other fiscal policies.
- budget expenditures including sectoral allocations.
- regional development (added here because of its intrinsic significance in developing countries).

Those macro-policy elements can be brought to bear upon the earlier identified aspects of sustainable development needs:

- resource management
- environmental and impact management
- management of population factors

The relationship between those macro-policy elements and sustainable development needs can be expressed in the form of a matrix.

POLICIES	Resource Management	Env. Mgt. and Impact Mgt.	Population Factors
Balance of payments: - exports - imports			
Capital Account - aid flow - foreign investment			
Budget Expenditures - Sectoral Allocations - subsidies - routine (D & M) - project investments			
Regional Development - guidance for budget allocations - locational incentives - licensing			

Each box of the matrix represents the specific policy measures to be taken. Each box also represents the needed economic analysis that is to precede the formulation of policies. What will be entered into each box will be different from country to country and it is difficult to generalize but perhaps some examples would provide an illustration.

a. Balance of Payments

In terms of the balance of payments, for most developing countries the export of natural resources will continue to dominate earnings. Exports might be based on a single or on a mix of several natural resources and most developing countries will attempt to increase the volume of exports while at the same time attempt to diversify such imports. Where possible countries would try to obtain a value-added increase by processing or semi-processing natural resources prior to export.

Attempts to increase the volume of export of particular natural resources will mean additional pressure upon the utilization of those resources and on associated resources. For instance, export expansion will in most cases increase the demand for land and also for water which, in turn, forecloses the use of that land and water for other purposes. Thus, the question to be analyzed is how to sustain the growth of specific types of exports without increasing disproportionate pressures upon other resources and without destroying other opportunities for export in other sectors. Also, whether such growth would come at the expense of unbearable future costs. In such a case, if even present levels of production of a specific resource cannot be maintained, the contribution to the balance of payment derived from its export cannot be sustained either.

b. Capital Accounts

With reference to capital account the focus on assistance flow and foreign investment has been adopted because of their significance in the economies of developing countries and therefore their potential significance upon the environment. In both categories, until recent years, the environment was largely ignored or, at best, treated as an appendix in project planning. More and more, however, foreign investments had to heed national regulations on impact analysis as these were promulgated by more and more governments. Those regulations also apply to assistance projects and in general donors and funding agencies are being urged to ensure that their projects consider environmental considerations even in the absence of relevant legislation.

Often such urgings have come from host or recipient governments themselves but sometimes international public opinion, awakened by NGO's, is the source of pressure. Donor country governments and the public at large have also added to such pressures.

Observance of environmental considerations has generally been in terms of impact prevention through the application of environmental impact analysis. The cost of such an analysis can readily be internalized in a project's overall cost-benefit analysis. Observance in terms of using funds for resource-management and resource-renewal is more rarely the case and should be recommended more actively by host governments. Resource-management and resource renewal have greater and more lasting long-term effects but these aspects are more difficult to deal with in economic analysis compared to impact management.

Another important aspect of investments which has environmental implications in the use of investment to increase the value-added components of export products. Such investments would help ease the pressure on natural resources and help create employment opportunities.

c. Budget Revenues

Governments raise revenues to finance their operations and the pursuit of their objectives. The adoption of sustainable development would have as consequence that additional revenues be raised in line with policies that are directed towards resource-management, impact-management and the management of population factors. Taxation can therefore be used to obtain greater efficiency in resource-use, to direct economic efforts into the direction of specific resources and away from others and to ensure observance of environmental legislation.

Consequently, the decision of what kind of taxes should be imposed will now have to include environmental considerations. For instance, in order to reduce pressure upon forests, export levies could be applied to the export of unprocessed forest products. While export earnings might initially drop, it can be anticipated that over time the decrease will be off-set as the export of processed or semi-processed forest products increases.

The range of tax options to be imposed will differ from country to country and making generalizations would have not much use here. Also, the difficulties in imposing new taxes will greatly vary from case to case.

The foregoing are examples of the aspects that are to be analyzed by economists with the participation of environmentalists. Those examples also illustrate the potential of taxation as a component of a system of incentives and disincentives for better resource and environmental management.

d. Budget expenditures

The adoption of the principles of sustainable development would require that budget allocations be reviewed and reanalyzed in the light of environmental management needs that must be met. Also in the light of the anticipated environmental impacts of budget allocation to the various sectors.

Such a review would be the most difficult and the most complex aspect of economic analysis for the purposes of formulating sustainable development policies. It is through that analysis that the various options are to be identified to be presented to the decision-makers. New analytical approaches and procedure will have to be developed as well as new criteria for the establishment of hierarchies of policy priorities.

The range of variables to be considered in the analysis is very broad. Some variables are straightforward and relatively easy to deal with such as, for instance, the extra expenditures required for making environmental impact analyses. Others, such as the issue of expenditures in the form of subsidies, are more difficult to deal with. Spatial distribution of economic activities must be considered and short-term and long-term benefits must be weighed against one another.

In short, a new and restructured planning process seems to be required to accommodate the environmental variables that are to be included. It is in this context where the greatest challenge lies for economists and environmentalists.

e. Regional Development

In a sense, regional economies constitute microcosms of the national macrocosm and what applies to the national scene also applies regionally. But the sets of economic variables, environmental and population variables might be greatly different from region to region in many developing countries.

The difficulty lies in the disparities of capabilities and of potential between regions and, as a consequence, different degrees of dependence upon the central government. Thus, while regional planning would be necessary and desirable, all of those plans should fit within an overarching national plan. Fine-tuning the relationship of each region and the central government will also be necessary and will be a difficult and complex task.

Required Changes in Economic Attitudes

The foregoing was intended to provide an illustration of how renewed economic analysis should be carried out within the context of the standard elements of macro-economic policies as these are related to environmental management. Earlier on the needs for new tools of economic analysis and of a renewed database were mentioned. But more than that there are a number of overarching considerations to be observed:

(1) Economic analysis must now be conducted in the context of a longer time-frame, often a trans-generational time frame

(2) There is the need for more government intervention as a number of environment and population aspects cannot be easily internalized into economic analysis without some government intervention.

(3) Economic planning has acquired a renewed significance and should be carried out on the national as well as on the local, regional level.

(4) More than ever before economists must now consciously and methodically come to grips with factors which were not originally within the scope and range of attention of economics.

In addition, there may be other objectives of sustainable development that are being pursued and that were originally beyond the horizon of economists. For instance, the pursuit of equity as a development objective would require considerable attention because of its economic costs and other economic implications. Disparities in conditions, in levels of development and in levels of the quality of life add to the problems to be considered.

International Conditions

For an individual country, under the best of conditions, the pursuit of sustainable development would be difficult enough. Domestic conditions attendant to underdevelopment, rapid population increase, and so on make it a difficult task. That task has become much more formidable because of existing global conditions today.

Several environmental problems have acquired global dimensions. While their negative impacts will be global, it is likely that the more serious impacts will be suffered by the developing countries. This will cause additional strains upon their economies, taxing their limited resources, financial, technical and organizational capabilities. All of this will hamper the implementation of sustainable development and of environmental efforts at a time where they are most needed.

Another bothersome aspect is the apparent decrease in international cooperation and, again, at a time that such cooperation is most sorely needed. Separately, development activities and environmental efforts require international cooperation and the integration of environment and development would need even more cooperation.

The needed cooperation pertains not only to transfers of capital and of technology, but also to trade provisions between countries. For instance, there are more barriers affecting the trade of semi-processed and processed lumber in comparison to raw lumber. This encourages the export of unprocessed timber at the expense of processed wood products.

The difficulties in capital-flows as these are related to the environment are exemplified in an issue that has been raised at several international forums, namely the issue of additionality. In reactions to appeals to increase assistance for environmental purposes, several donor countries insist that such an increase should not be additional to the total amounts they have earmarked for technical assistance.

The most international aspect of present international conditions that should be considered is the phenomenon that can be succinctly described as economic globalization. This refers to the increasing interdependency of economic activities throughout the world.

When duly recognized and properly managed, such an interdependency could have beneficial effects. But the fact is that the existing interdependency is lopsided in the favor of the industrial countries. It therefore holds the potential of inflicting great damages upon some developing countries for some doubtful, limited and short-term gain on the part of some industrial countries. This is the case as global conditions are still characterized by great disparities in wealth, power, technology, access to information and to other resources.

What is even more disturbing is that certain aspects of economic globalization, of supra-national economic activities are now beyond the managing capabilities of individual nations, acting on their own. Included here are aspects of capital-flow, of the totality of monetary and financial transactions, of trade patterns and the flow of resources in general. One might add that the flow of human migratory movements is also becoming more and more difficult to manage.

Conclusion

The twin phenomena of environmental globalization and economic globalization and the high potential of negative impacts that they contain should be seen as warnings. We are being warned that the adaptive capabilities of the globe as an ecosystem are being seriously strained; that the adaptive capabilities of the globe as an economic and a social system are under similar strains. We are being warned that we are rapidly heading towards the limits of man's present capabilities to adapt himself to this physical environment and to his social environment.

These are the global problems that we face and their solution would require global cooperation. But it would not be enough for such global cooperation to be merely directed towards preventing or overcoming environmental damages. Nor would it be enough if global cooperation were merely to be directed towards mitigating human suffering through doles of charity that pass as technical assistance. Those efforts might be necessary but they are not enough because what is needed is a concerted effort to nurture the earth's adaptive capabilities, to sustain it as a life-support system. What is needed is to nurture man's capabilities to adapt to his environment through a renewal of the structures of human interaction. To develop new patterns of economic relations within those new structures of human interaction is the challenge and the duty of economists.

TITLE: Panel Presentation
SESSION: Friday 10:30 a.m.
BULLETIN NO.: 23

GUY RIVARD, Minister for Technology in the province of Quebec spoke of sustainable development as the new "Quiet Revolution". "Sustainable development involves all sectors and members of society," he said. It is not a matter of implementing a few additional environmental protection measures while keeping intact our methods of production and our consumers' habits, he said. "Sustainable development means reviewing the very foundations of our society.

"Business and industry must also become rapidly aware that on a world scale, protection of the environment is becoming a new competitive factor," said Rivard. Existing production processes will have to give way to new ones, he insisted. He spoke of environment-conscious technologies which discharge no waste or only minimal waste into the environment and which make maximum use of raw materials. "They combine the imperatives of environmental protection with efficiency and profitability," he said.

Rivard cited three basic mechanisms to aid in bringing about needed societal changes: persuasion; a sense of commitment; and, the use of incentives. As an example, he spoke of the results of the Quebec Round Table on the Environment.

The Quebec Round Table has brought together and persuaded some 200 leaders from all sectors to act as intermediaries between the Round Table and their respective sectors. These individuals were called upon to draw up projects for sustainable development in their own sectors and to make a commitment to respect the principles of sustainable development in all their activities.

The Round Table has also proposed a code of behaviour. "It is two pages long and contains five elements: to prevent, conserve, recycle, repair, and educate." On the subject of incentives, Rivard said: "Since we must reorient our production methods and consumers' behaviours, positive and negative incentives will play a major role," said Rivard.

In closing, he invited all members of the national and provincial round tables to meet in Montreal in early 1991 to discuss their experiences and make additional inroads in achieving sustainable development.

BILL BARLEY, general manager of Fluorocarbon Products, DuPont Canada, spoke of protecting the ozone layer. "From wonder chemicals of the mid-twentieth century to environmental suspects in the 1980s, chlorofluorocarbons (CFCs) represent the sustainable development theory in action," he said.

He cited the evolving scientific understanding of the link between CFCs and the depletion of the ozone layer as the basis for governments, industry and the environmental community to work together more fully in finding solutions. "These solutions must balance potential environmental impacts on the one hand, and safety and health risks on the other, along with the serious disruptions to society that would result from eliminating CFCs too quickly," said Barley.

While stating that much remains to be done on both the scientific front and within the CFC-producing and using industries, significant progress is being made, he said. "A new target is to phase out CFC production by the turn of the century," said Barley.

IAN SMYTH, President of the Canadian Petroleum Association, addressed the global opportunities for business and the environment. "For the first time, the Canadian business community has the opportunity to take a leadership role instead of taking a back seat in the area of sustainable development," said Smyth.

Sustainable development needs to be applied rather than discussed, he said. "The cost of reversing or slowing down the rate of degradation is enormous," he said. He projected the costs would near $45 Billion by the year 1990.

Smyth suggested that a more positive face could be put on sustainable development. "Corporations willing to develop practical solutions stand to profit from their efforts," he said. Canadian business plays a leading role in the integration between the environment and industry, said Smyth.

He closed by inviting participants to attend the "Globe '90" conference and trade fair to be held in Vancouver, B.C. in March 1990.

LE DÉVELOPPEMENT DURABLE: UNE NOUVELLE RÉVOLUTION TRANQUILLE

The Honourable Guy Rivard

Minister for Technology, Province of Quebec
Quebec City, Quebec G1R 4Y4

La présente conférence, deux ans après la parution du rapport Brundtland, par la richesse de ses sujets et par la qualité de ses participants témoigne du chemin considérable qui a été parcouru en peu de temps. Il faut remercier les organisateurs de cette conférence de nous avoir donné à tous l'occasion de voir les progrès et poser de nouveaux jalons dans les négociations entre économie et environnement.

We have already heard at this meeting that calls for immediate action are increasing in number. However, if we want our actions to match our hopes and expectations, we must correctly identify the nature and scope of the challenge ahead of us and come up with appropriate solutions.

An Unprecedented Challenge

Sustainable development is an unprecedented challenge, given the type and scope of the necessary changes. Sustainable development means reviewing the very foundations of our society. Economic and environmental concerns cannot be reconciled by implementing just a few additional environmental protection measures while keeping intact our methods of production and our consumer habits. Business and industry must also become rapidly aware that on world scale, protection of the environment is becoming a new competitive factor. Over the decades to come, products and technologies will not enter and remain on the market unless their "environmental performance" is up to expectations. Investing in the environment is not simply a matter of pollution control equipment acquisition. From now on, at the very heart of our industrial choices, we will find a very different view about our production technologies and our products.

Les produits mis sur le marché, dans leurs caractéristiques internes et dans leur emballage, doivent causer le moins possible de pollution en cours d'usage, et après usage en tant que déchet. Par exemple, pesticides et fertilisants biologiques remplaceront en bonne partie les fertilisants et les pestidices chimiques. L'emballage réutilisable ou recyclable surplantera l'emballage jeté. Les entreprises les plus perspicaces et les plus dynamiques commencent déjà à remplacer la gamme de leurs produits. Certains pays européens semblent avoir compris plus vite que nous, en consacrant des efforts importants à la mise au point et à la promotion de ce qu'ils appellent des eco-produits, c'est-à-dire des produits les moins nocifs possibles pour l'environnement.

Where technology is concerned, a similar review is in order. Existing production processes will have to give way to new ones. Emphasis will be on much stricter performance criteria. Technologies in an environment-conscious society are more energy-efficient. By definition they discharge no waste or only minimal waste into the environment, and make maximum use of raw materials notably by reusing residues in the manufacturing of by-products. Given equal production volumes, these clean technologies entail considerably less resource consumption and degradation. They combine the imperatives of environmental protection with efficiency and profitability for the industry. Sustainable Development is, therefore, based on applying environmental concerns to reassessing investments in product development, the introduction of new technologies, resource exploitation and infrastructure review.

Les changements qu'implique le développement durable ne sont pas seulement considérables par leur nature; ils le sont aussi par leur ampleur. Tous les secteurs et tous les acteurs de la société sont touchés. La mise en oeuvre du développement durable suppose un renouvellement des pratiques d'exploitation agricole, d'exploitation forestière, des techniques de production et des modes de consommation. Elle va refaçonner les attitudes et les comportements des producteurs, des distributeurs, des consommateurs, des financiers, des gouvernements et de toutes les associations sectorielles. Si tous sont ainsi concernés, tous doivent aussi apporter leur contribution. La mise en oeuvre du développement durable suppose une certaine synchronisation dans les changements de tous et de chacun. Nous en avons un bel exemple avec la récupération et le recyclage du papier. Les consommateurs sont prèts à faire leur part; mais si les producteurs n'intègrent pas suffisamment de fibres recyclées, la récupération est vouée a l'insuccès. La mise en oeuvre du développement durable passe ainsi par l'ouverture et l'organisation de nouveaux marchés.

This challenge is completely unprecedented in its nature and scope. Let's take a minute and consider what this means. Sustainable development involves all sectors and members of society; It represents a social choice. It is something that society will have to accomplish within the context of a new, more equitable international balance. As leaders, as governments, are we really able to bring about such a change? The question in itself raises some doubt, especially if we look at areas where immediate action is needed. Yet, I think we can be optimistic.

Optimism is based, among other things, on experience of the 1960's. This was a historical period of very rapid change. We called the period the Quiet Revolution. Quebec moved from a traditional society to a very liberal and dynamic one. Over only a very few years, attitudes changed, our culture evolved and the government adopted initiatives to structure our economy. Wide-ranging socioeconomic changes are indeed possible and can be carried out relatively quickly. Sustainable development could very well represent a new quiet revolution, an even more decisive one than its predecessor in that it affects the very form development takes.

Un Défi Relevable

Comment pouvons-nous relever un tel défi? Si la reconciliation de l'économie et de l'environnement est d'abord un choix et une oeuvre de société, il faut pour la rendre effective faire appel aux mécanismes économiques et aux mécanismes sociaux qui sont source de dynamisme dans la société. Je voudrais souligner l'intérèt de certains de ces mécanismes, qui ont guidé la table ronde Québécoise sur l'économie et l'environnement dans sa façon de préparer pour le début de 1990 un plan de mise en oeuvre du développement durable au Quebec. Nous croyons que plusieurs de ces mécanismes pourraient guider la démarche des intervenants dans l'ensemble des régions du Canada en vue d'une conférence nationale Canadienne sur le développement durable!

Persuasion. In social relations, the most profound changes in attitudes and beliefs usually spring from direct encounters and discussions between individuals. Consequently, over the past weeks, Quebec Round Table members have met with some 200 leaders from all sectors; professionals, financiers, users and distributors of natural resources, communicators, environmental groups, labour unions, and public and parapublic sector representatives. These leaders have agreed to act as intermediaries between the round table and their respective sectors. These leaders have decided to be the champions of sustainable development.

A sense of commitment. A commitment made publicly by a CEO or an agency director is usually a sustainable one. So, the Round Table called upon these individuals to draw up projects for sustainable development in their own sectors and to make a commitment to respect the principles of sustainable development in all their activities. To help them understand the real meaning of sustainable development and to show them how to implement it, the Round Table has proposed a code of behaviour. It is two pages long and contains five (5) elements: prevent, conserve, recycle, repair, educate. Next November, we will hold a Quebec summit meeting on sustainable development. We expect project leaders to come to this meeting and discuss their individual experience with the code. We are looking for concrete projects for models as well. In the meantime, a newsletter will highlight these initiatives.

Incentives

There is no need to expand on possible fiscal incentives for the use of clean technologies or heavy fines for polluters. But what about adding to the cost of an activity - such as garbage removal and disposal - the real cost in dollars to the environment? What about paying $100 or $200 a ton of garbage - the real cost - instead of $20 like we do in Montreal? Don't we all know that such an action would most probably modify our taxpayers' view about that bi-weekly activity?

In closing, Round Tables on the Environment and the Economy are a preferred forum for concerted efforts. Each Round Table must find out how sustainable development can be implemented, taking into account the economic and social structure of its part of the world.

But this is not enough. We must bring our minds together, like we do today. We must act together. This is a Canadian challenge. This is a Canadian task that lies ahead.

As a member of the Quebec Round Table, I propose to you that the members of all of Canada's Round Tables meet in Montreal in early 1991 to discuss their experiences and to make additional progress towards achieving sustainable development.

I am also very proud to announce that next week, at the summit of the Francophone countries in Dakar, Senegal, Quebec will encourage discussion and consensus on sustainable development. The challenge is a big one. But we are not afraid of quiet revolutions. We will meet this challenge for our generation and for the generations to come.

PROTECTING THE OZONE LAYER
THE SEARCH FOR SOLUTIONS

Bill Barley

General Manager, Flourocarbon Products, DuPont Canada
P. O. Box 2200
Streetsville, Ontario L5M 2H3

Ladies and gentlemen:

The search for solutions to protect the earth's ozone layer is a dynamic situation. It exemplifies sustainable development on a global scale.

The CFC/Ozone story is about science -- science that gave us something beneficial -- for our economic development, our health, our safety and the security of our food supply. Later, science told us that this very useful chemical has the potential to be detrimental -- not directly or immediately -- but to the long-term security of our global environment.

My talk focuses on three things:
- -- how the world has become dependent on chlorofluorocarbons, or CFC's;
- -- on the evolution of learning and concern about their environmental impact; and...
- -- on private industry's work to remedy the problem.

Our worldwide dependence on CFC's began at the end of the roaring twenties, when General Motors found the perfect replacement for the flammable and toxic chemicals used for refrigeration. CFC's were a breakthrough. Non-flammable, non-corrosive, and non-explosive, CFC's are very low in toxicity and safe to work with.

We all use CFC's. We use them in our homes, apartments, office buildings, hospitals and manufacturing plants. We use them for temperature and air quality control, air conditioning, energy conservation, insulation and refrigeration. We use them to make telephones, TV's, radios, VCR's, and computers. And, we use them to sterilize surgical instruments, to cool X-Ray equipment, to refrigerate blood, plasma and drugs.

Seventy-five per cent of the food we eat depends on CFC refrigerants at some point in the production and distribution chain. They serve as refrigerants, and as blowing agents they are used to make the insulation in the walls of our refrigerators, and the refrigerated trucks and boxcars we use to transport food. Increasingly, they provide improved energy efficient insulation for our homes as well.

All of us who flew into Winnipeg used CFC's. They regulated the airplane's air temperature; they were used to make the thin insulation in the plane walls and the cushions we sat on. They kept the meals cold until the microwave oven, also made with CFC's, warmed it up. Our pilot relied on them for the accuracy of his instrument panel.

We cannot live the way we live without them. We cannot live the way we live without something to replace them.

The functions performed by CFC's are critical to the economies of most nations in the world, and certainly to all developed countries. In North America, well over 5,000 types of businesses, producing goods and services worth more than 35 billion dollars a year, use CFC's.

There are more than three quarters of a million CFC-related jobs and about 160 billion dollars worth of installed equipment that depend on CFC's in North America. In Japan, CFC's are completely integrated with the economy and, for developing countries, learning to live without them poses a serious challenge to basic development improvements.

You might ask what doesn't use CFC's. For one, aerosol cans. In the late 70's, Canada and the USA banned the use of CFC's for aerosol propellants in personal care products. By the end of 1988, DuPont Canada had ceased sales of CFC's for all propellant uses except essential medical applications.

Nevertheless, the spray can is still the product most commonly associated with CFC's. In Europe, that image is more correct. In those countries that did not phase-out CFC's earlier, there is now urgent action to eliminate them.

CFC's have also been eliminated from the much smaller foamed food packaging market -- the polystyrene coffee cup and the foam hamburger box. Early last year DuPont began selling an environmentally-acceptable alternative called FORMACEL™-S to this market. The manufacturers and their customers were enthusiastic about the switch away from CFC's, which was complete in Canada by the end of 1988. The new blowing agent has 97 per cent less ozone depletion potential in these applications -- an incredible improvement for a drop-in replacement, and one that will likely be yet improved upon.

Despite the huge improvement, concern for the ozone layer has led some people to advocate that paper replace this plastic packaging. But even the forestry industry uses CFC's -- to refrigerate the frozen seedlings that renew logged-out forests.

CFC's are used so widely because they are among the most stable chemicals developed -- they have strong chemical bonds. Fifteen years ago, the first hypotheses were raised about CFC's and their environmental impact, which speculated about the effects of chlorine when these bonds broke up high in the stratosphere.

From these hypotheses, the evolution of learning and concern about the environmental impact of CFC's has been quick.

In the past three years, scientists gathered and analyzed reliable data to confirm theories about the interaction of chlorine with natural compounds. Their results led them to generally agree that chlorine concentrations may ultimately affect the ability of the ozone layer to filter out some of the sun's ultra violet rays. That scenario raised the spectre of environmental impacts ranging from effects on aquatic and wildlife to increased incidences of human skin cancer.

The scientific evidence first elicited international, and then national, regulations to govern CFC production and use. The international apparatus of governments is moving with surprising swiftness, along with the boom in environmental and scientific knowledge.

DuPont relies on the best science available at the time. In the late '70's, this led the Company to work on understanding the environmental issues and on research to identify alternatives.

Learning about the complexities of the ozone layer made understanding the potential impact of CFC's more difficult. It does not just sit out there -- invisibly -- like Captain Kirk's deflector shield. It is a dynamic and changing ring of gases.

Ozone concentrations vary widely in the layer due to natural causes, such as sun spots and volcanic eruptions. Day to day changes of as much as 25 per cent are not uncommon, and geographic variations are even more extreme. Sometimes there is almost twice as much ozone over the North pole as over the equator, for example.

Scientists learned a great deal very quickly using computer models and sophisticated analysis. The space program also helped. The first consensus opinion from the scientific community that chemical reactions in the ozone layer had the potential for long-term damage was published in March, 1988. It was called the report of the NASA-sponsored Ozone Trends Panel. DuPont's top atmospheric researcher, Dr.Mack MacFarland, was part of this joint academic, government, scientific and industry group.

Their findings concluded that chlorine may have contributed to a two per cent decrease in global ozone since 1970. They also showed that unique meteorology, coupled with chlorine, are the most likely contributors to a larger seasonal ozone decrease in the Antarctic. Early 1989 studies revealed concentrations of chlorine in the Arctic atmosphere as well, although a "hole" was not found.

Environmental concern is paramount, but it is not feasible for society to stop using CFC's immediately. Without refrigeration, most of the world's medical supplies would perish. Large quantities of the worlds' food would be wasted or not there when required. We must sustain the environment, and we must sustain what is vital to society. There must be a practical measured response. The CFC-dependent world cannot go "cold turkey", but we must get rid of CFC's as soon as we can.

DuPont responded to the Ozone Trends Panel immediately. In March, 1988, the Company set as its goal an orderly transition to the total phase-out of CFC production, as soon as possible -- but no later than the turn of the century.

The switch to alternatives will not be like the switch we made from leaded to unleaded gasoline. It is more like what happened when Edison's electric light replaced gaslight. The alternative chemicals, and the equipment to use them, are quite different for many applications using CFC's.

The alternatives development program involves research, toxicology tests, the identification of commercial processes, and building and modifying plants -- as well as redesigning and modifying users equipment. All of this is underway.

We are fortunate that the scientific evidence continues to indicate that ozone depletion from CFC's is not an imminent threat. We can avoid the serious safety and health risks and the upheavals to society that would occur from eliminating CFC's before other options are available.

On the legislative front we are being guided by the international process of the Montreal Protocol. DuPont was an early, and remains an active, supporter of the United Nations Environment Programme's Montreal Protocol. It is a living document, and through it, government, industry, and environmentalists are building a framework for more stringent controls as warranted by evolving scientific understanding. Indeed, the recent Helsinki Conference moved further to a growing consensus for a near total global phaseout of fully halogenated CFC's and halons.

For private industry, there are no half measures where risk and opportunity are concerned in this switch. It is not an insurmountable problem, but we must get it right the first time. There are huge technical challenges related to an orderly transition from CFC's to alternative products. Private industry is working both quickly, and in a co-operative way, to try to remedy the world's CFC problem.

We must develop substitute products with all the desirable properties of CFC's but with little or no potential to affect the ozone layer. We know that each CFC replaced will need several substitute products for different market segments. The selection of substitutes involves a balancing act that must consider safety, environmental impact, cost and performance. As members of the fluorocarbon family, hydrochlorofluorocarbons (HCFC's) and hydrofluorocarbons (HFC's) provide the best balance of all these factors.

On the environmental impact side, HCFC's have vastly reduced ozone depletion potential compared with CFC's - on average 95 per cent less, while HFC's, with no chlorine content, have zero ozone depletion potential. HFC's and HCFC's are effectively destroyed in the lower regions of the atmosphere, in contrast to the CFC's that are only destroyed after the slow process of mixing into the upper levels of the atmosphere. All of these alternatives also provide significant reduction in CFC greenhouse warming potential.

HFC's and HCFC's offer performance advantages similar to CFC's, including low toxicity, in-use stability, low or no flammability, no smog production and minimal engineering changes to equipment.

Because of these similarities to CFC's in critical applications, the use of HFC's and HCFC's will result in a faster, less expensive transition from CFC's, which in turn will result in long-term environmental improvements.

Although some technically feasible non-fluorocarbon substitutes have been identified as possible solutions, they would result in compromises in terms of safety, other environmental impacts, cost or performance, when compared to HCFC's and HFC's.

Industry has formed three international groups to ensure that these alternative products have no unexpected impacts on either humans or the environment. Two of these programs are designed to accelerate toxicity testing, while the third is studying environmental effects, including ozone depletion and global warming potentials. The full battery of toxicity tests is expected to be done by the early part of the coming decade. Soon thereafter, we hope to begin world-scale production of the leading alternatives.

DuPont expects to invest more than one billion dollars during the next 10 years to build new manufacturing plants or modify existing ones. In 1988 alone, we put over 70 million dollars into research and development and capital expenditures for alternatives.

Capital requirements for all CFC producers worldwide to restructure their businesses could total 6 billion dollars over the next decade. But this pales in comparison to the capital outlays by industries that make refrigeration, air conditioning and cleaning equipment, as well as insulation and plastic foam products.

Replacing existing equipment will be an enormous task. For example, we estimate that worldwide, there are about 120,000 industrial refrigeration machines, or chillers. We currently have the capacity to build about 4,500 new units a year. If we dedicate all the chiller manufacturing capacity in the world to replace existing equipment, the task will take 30 years. The obvious conclusion is that we will need a retrofit solution if we are to phase-out CFC's in a timely fashion.

We must be fully aware of the magnitude of the undertaking and the possible repercussions of a too-rapid or inconsistent phase-out. Having said that, we are optimistic that environmentally acceptable alternatives will be commercialized in the early to mid 1990's. At DuPont, we plan to commercialize a series of new products over a 3 to 5 year period beginning next year, assuming no unforeseen problems.

Here are some of the initiatives DuPont is involved in:

- For refrigeration and air conditioning, we have major programs underway for HCFC-123, HFC-134a, and new refrigerant blends. HCFC-123 is being evaluated to replace CFC-11 in commercial air conditioning and industrial manufacturing systems. We want to develop retrofit technologies using HCFC-123 for other major types of industrial process and air conditioning units.

- DuPont is in the process of building a commercial scale plant for HFC-134a, to replace the major refrigerant, CFC-12. We are already producing test quantities of HFC-134a at three small facilities.

- Over half of refrigerants go to service existing equipment. DuPont has found a blend which may be usable in some existing equipment with minor modifications. The technology can be used today with commercially available products that reduce ozone depletion potential by 60%. In 2 to 3 years, we hope to improve the blend to reduce ozone depletion potential by 97% compared to CFC-12.

- For the manufacture of energy efficient insulation for refrigerators and home and building construction, we are evaluating several blowing agent candidates, HCFC's-123 and 141b.

- For foam cushion manufacture, we are developing products that will utilize four different HCFC's alone or in blends. Work is progressing rapidly in these segments due to the commercial availability of three of the four HCFC's.

- In the food packaging market, we have already put a highly purified grade of HCFC-22 under the FORMACEL™ trademark on the market. This reduces the ozone depletion potential of this use by 97%.

- Replacing cleaning agent CFC-113 is a challenge. Last year we introduced two commercial interim cleaning agents with lower ozone depletion potentials, and two months ago announced two new candidates for certain applications in the electronics industry. Meanwhile, research into a longer-term solution continues. We have also started, and are encouraging, recycling programs for CFC-113.

That is a thumbnail sketch of some of the things that are going on at DuPont. The activity is frenetic throughout the rest of our industry as well.

DuPont intends to continue its strong leadership role in the search for solutions to end our worldwide dependence on CFC's. In Canada and the U.S. DuPont is a leader in joint producer-user groups who are together in their support of the Montreal Protocol and in their support of responsible policies on CFC's.

These joint groups also support the co-operation between policy makers worldwide and all segments of the CFC industry. This co-operation is necessary to continue meeting essential societal needs while protecting the ozone layer. Both goals can be achieved through a rapid transition from CFC's to a combination of alternative products and technologies.

Internationally, we urge that policy makers facilitate a timely transition by establishing an achievable schedule for CFC phaseout, consistent with the availability of alternatives in commercial quantities. This means committing to the long-term use, a normal life cycle, of those alternatives. A business climate that encourages investment in the manufacture of alternative products is the fastest and most effective way of improving this global environmental problem.

We also urge developed countries to co-operate with developing countries to ensure that the latter have cost-effective alternatives. Otherwise, the use of CFC's could grow in those nations that are outside the Montreal Protocol process.

We must keep our focus on support for a global response to this global problem. That means resolving the regulatory uncertainty that is growing with legislative initiatives at world, national, regional and local levels. A patchwork of legislation will only discourage the investment required for transition to alternatives, and may hinder the total global achievement of the Montreal Protocol objectives. We favour Canada's establishing one national, practical set of controls.

In keeping with the goal of sustainable development -- development that ensures that what we do today does not damage our living standards and environment for the future -- it is a given that CFC's will be replaced. They played a beneficial role in the development of modern society. CFC's, are used in the manufacture of electronics, which gave us the computer modeling technology to understand that, unless they are phased out, CFC's have the potential to harm the future environment.

At DuPont, our environmental affairs philosophy is that protection of the environment is an integral part of doing business. We are moving quickly to achieve our goal -- an orderly transition to the total phase-out of CFC's. With the help of all interested parties, we will achieve this goal.

GLOBAL OPPORTUNITIES FOR BUSINESS AND THE ENVIRONMENT

Ian R. Smyth

President, Canadian Petroleum Association
Suite 3800, 150-6th Avenue S. W.
Calgary, Alberta T2P 3Y7

I cannot really add to the many things you have heard over the last few days about sustainable development, since you have heard the views of many experts in that area. I do want to stress, however, that widespread acceptance of the interdependence between environment and economy means at least as much to the business component of the environmental movement in Canada as it does to others. For the first time, Canada's business community has an opportunity to take a leadership role rather than a back seat in environmental management. To put that another way, we now have an opportunity to help invent our future in this crucially important area.

In recent years, I have spoken often to my business colleagues about the costs and benefits of bad and good environmental management. I am greatly encouraged by the increasing attention business leaders everywhere in Canada are giving to both sides of the issue. In that vein, one can only applaud the thrust of this conference. To get the job done, we must emphasize the business side of sustainable development, because it is now time to move from focusing on definitions of the problem to action. Speaking in business terms, what are we going to do about the degradation of the global environment?

Let me put that question in perspective. As everyone in this room realizes, the costs of reversing or even slowing down the degradation of our environment are simply astonishing. For example, according to some sources, by 1995 the worldwide costs of addressing the greenhouse effect could reach 45 billion dollars per year. Worldwide reforestation will cost on the order of 6 billion dollars annually. And 90 billion dollars a year are needed to combat desertification, a problem closely related to deforestation.

These are just a few of the problems we face: Waste disposal and clean-up and dozens of other major environmental problems facing the planet are each likely to cost additional billions of dollars per year by the end of the next decade if we are to keep this planet habitable for future generations. These statistics help illustrate the magnitude of the problems, and of the challenges before us.

But there is another, more positive face to the gloomy business of environmental degradation. And it is the face of opportunity. To begin solving global environmental problems, business must become aware of the business opportunities those problems imply. There are two considerations here: First, companies that are willing to develop and market practical products, technologies and services as environmental solutions stand to profit from their efforts. Just as importantly, the industries under pressure to meet ever more stringent environmental standards must begin to apply new technologies and systems, since those developments will affect bottom lines, too.

These two factors have led to an important development. In effect, over the last decade or two business has responded to the new challenge of environmental protection by creating an environment industry. That industry has responded to the very real opportunities now available by supplying environmental products, services and technologies to a host of end users. It has enabled existing industries to increase profit margins through cost efficient resource use. And it has helped meet the growing demand for environmental information services, research and training.

While the growth of this industry has been global in scope, Canadians have been leaders in sound environmental management and, therefore, important contributors. A full litany of technologies developed in Canada would take too long to enumerate, but it would include petro-sludge processing, solid and liquid waste incineration, and smoke-stack scrubbers. It would also include new developments in bio-engineering, toxic waste management, water treatment, waste disposal, geographic information systems, resources and environmental planning, environmental data processing and modelling, clean technologies, recycling, monitoring and chemical analysis.

It would include research like the Acid Deposition Research Program sponsored by the Alberta Government and the Canadian Petroleum Association -- research which has been acclaimed by scientists world-wide as the best of its kind ever performed. And it would include such innovative steps by industry as the CPA's Environmental Code of Practice and operating guidelines which were developed by and are used by our member companies.

These developments have been part of an evolving process of government and industry cooperation in meeting environmental challenges. Here are some key developments in recent years.

As you know, federal and provincial governments, industry, and special interest groups made submissions to the United Nations World Commission on Environment and Development when it visited Canada a few years ago. Following the World Commission's visit, the Canadian Council of Resource and Environment Ministers (CCREM) established a National Task Force on Environment and Economy to, and I quote,

> initiate dialogue on environment-economy integration among Canada's environment ministers, senior executive officers from Canadian industry, and representatives from environmental organizations and the academic community.

I had the privilege of serving on that task force, as did a number of other speakers at this conference.

As a result of our efforts, provincial and territorial round tables which serve as a permanent forum for all sectors to meet and cooperate in preventive planning are now being put in place in accordance with one of our major recommendations.

Here in Winnipeg, a National Centre for Sustainable Development has been established to serve as a central clearing house for information and discussion on sustainable development.

The recent throne speech for the opening of the second session of the thirty-fourth Parliament of Canada emphasized the federal government's commitment to environmental issues and to a strong Canadian environmental industry that will tap into market opportunities at home and abroad.

And finally, of course, this week's conference on environment and economy here in Winnipeg, with its distinguished gathering of leading decision-makers from all sectors, marks a significant step toward achieving sustainable development.

This evolution in Canada of cooperative consultation between all parties has contributed greatly to the sustainable development concept. But many recent national and international initiatives have been limited to policy and program definition -- and have been delayed by discussion about the meaning or definition of sustainable development. We haven't had much to put in the window.

I think we all agree that that's simply not good enough: sustainable development demands more than just meetings and consultation. It needs to be applied. The incorporation of its principles into actions and decision-making at all levels can be greatly enhanced if sustainable development strategies permit individuals and corporations to realize profits from environmental innovation and risk-taking. In my view, a market-oriented approach to the question will do much at the local level to begin arresting the erosion of the world economy's resource base.

This brings me to the crux of my presentation today. In March 1990 Vancouver will host a major international conference and trade fair called Globe '90. Globe '90 is designed to focus on the business opportunities inherent in sound environmental management, to promote the practical implementation of sustainable development, and to aid the transfer of technology to developing countries.

The Canadian Petroleum Association is a sponsor of Globe '90, because we believe it represents a good step toward translating the concept of sustainable development into action, particularly from the business perspective. The organizers have taken a product-oriented, hands-on approach, and they represent people from relevant industries and disciplines.

Now because I believe strongly in this project, I am going to end my presentation today by doing a sales job on you. That's not something I ordinarily do in my speeches, but I can't think of a better place to really launch Globe '90 than this conference.

The Expo is a joint public sector/private sector production, and it is the first of its kind on this continent. It has received support from many professional, industrial and international organizations, from the provinces and from the federal government. It is guided by an international advisory board chaired by The Honourable John Fraser, Speaker of the House of Commons.

As you can imagine, then, we expect this event to have an extremely high profile. Now let me tell you about content.

Globe '90 will emphasize preventive, rather the remedial environmental management techniques -- techniques that could help us avoid the large and small-scale tragedies which, with names like Chernobyl, Bhopal and Exxon Valdez, have become part of the lexicon of modern life.

In my view Globe '90 will be a major point of transition from theoretical discussion to the practical application of sustainable development. It will enable business and industry to play a far more active role in the process, find out how the new environmental awareness affects them, and discover how to profit and otherwise benefit from new environmental technologies. Because it will be a combination trade fair and conference, it will stimulate a "hands on" approach: Products, services and technology discussed at the conference will be exhibited at the trade fair. In effect, this means new ideas can be tested against available technology on the spot.

In short, I believe Globe '90 will be a practical step to move us closer to making sustainable development a reality. It will be so practical, in fact, that we expect it to be continued biennially: Globes '92 and '94 will review and expand upon the successes of the first event. This will create continuity and a continual reviewing process for sustainable development. Globe will be the place to go every two years to learn about the state-of-the-art in the environment industry. It will catalyze further development of the products, services and technology of the environment industry.

Although the conference will be international, it will have a regional focus. The 1990 focus will be the Asia Pacific, the world's fastest-growing economic region.

The trade fair will involve more than 400 exhibits in BC Place Stadium -- already the United Kingdom, Japan, The Netherlands and Canada have optioned space. We anticipate attendance of 15,000.
The conference will involve more than 400 presentations at the BC Trade and Convention Centre, with a projected attendance of some 2 000 government, business, industry and research leaders from some 50 countries.

The focus of the conference will be the active role of business in developing efficient, environmentally sound, and profitable solutions to environmental challenges. In every way, the conference will stress integration: between business and environment and across environment sectors.

Conference participants will get the latest information on new environmental and industrial policies, economic and environmental management plans of governments and financial institutions around the world.

Each session will be designed to produce such practical results as hard copy recommendations or blueprints for sustainable development of a particular project/industry which can be implemented, then monitored and developed with each succeeding globe event. So Globe itself constitutes a sort of "action plan for the future."

It's the next big step towards finding solutions to the problems of sustainable development based on the bottom line. Thus, it represents another opportunity to do something more than talk. And with that admonition in mind, it is time for me to take my own advice.

Thank you.

TITLE: Closing Address
SESSION: Friday, 11:30 a.m.
BULLETIN NO.: 24

THE HONOURABLE GARY FILMON, Premier of Manitoba, presaged his closing remarks with the announcement that the Canadian Environment Industry Association will be headquartered in Winnipeg, Manitoba, and attributed this move as a direct outcome of the conference.

Filmon stated; "it is obvious that an environmental crisis is on our doorstep. All the danger signals are there. In fact, we don't have to look too far from this convention centre to the evidence of potential wholesale change occurring on our Prairies. You don't have to look too far afield to see the warnings of Brundtland or the interdependence of the environment and the economy."

"In Canada, we clearly have a self interest in protecting our resource base. Over 40% of Canada's gross domestic product, 33% of our labour force and 52% of our exports can be directly related to economic activities which are dependent upon the environment. In many developing nations the dependence is even greater," he said.

"Protecting the environment makes good economic sense, said Filmon, but people have to see it that way before real progress can be made. Too often, people are more comfortable with old problems than with new solutions. This is one of the reasons we have adopted broad based public consultations as part of the conservation strategy we are developing."

"The Brundtland Commission Report is emerging as the new environment and development bible," he stated.

He cited both the Brundtland Commission Report and the National Task Force on Environment and Economy Report as putting a heavy onus on governments and the private sector to change the way they do business. "Here in Manitoba, we have taken the messages very seriously to heart," said Filmon.

The government is moving on a number of fronts, he said. They include: a Round Table on the environment and economy which the Premier will chair; the establishment of a special Sustainable Development Committee of Cabinet, chaired by the Deputy Premier; the creation of a new Sustainable Development Co-ordination Unit in Executive Council; and, the initiation of a Sustainable Development Policy Formulation process via a comprehensive soil, land and water strategy.

"In addition, I have also made the Deputy Premier the Environment Minister, and we have moved to strengthen our environment department through additional resources," Filmon said.

Furthermore, he announced that an international conference will be held in Winnipeg in the Fall of 1990 to deal with the crucial issue of educating the next generation about the importance of sustainable development. "By that time, it would be my hope that the International Centre for Sustainable Development in Winnipeg will have started to function as an ongoing source of expertise for the growing number of sustainable development initiatives throughout the world, including the critical issues of education," he said.

"The immediate challenge to industry," said Filmon, "is to begin the voluntary process of adopting sustainable development principles and not to wait for government to legislate, regulate, and enforce." He predicted a day when industries will view jurisdictions that subscribe to sustainable development as desirable places to locate, that is, moving there "because of" and not "in spite of" environmental concerns.

"The environment assessment process is now achieving the political respectability and credibility that will enable it to become a truly central instrument for planning and decision making," said Filmon. "Sustainable development must become central to Manitoba's and Canada's new vision of itself," he concluded.

CLOSING STATEMENTS

The Honourable Gary Filmon

Premier of Manitoba
Room 204, Legislative Building
Winnipeg, Manitoba R3C 0V8

Thank you, Mr. Chairman.

At the outset, I would like to offer my congratulations to the organizers of this conference. It is with no pun intended that I say Frank Cosway and his Conference Steering Committee prepared a "Premier" event. I hope that you found the proceedings over the last three days as informative and stimulating as I have. In fact, my only regret is that such mundane things such as a throne speech and the opening of the Legislature have kept me from learning more about my real passion - Sustainable Development.

Frank -- I wonder if you could please stand for a moment.

On behalf of all gathered here, I would like to thank you for your many months of hard work leading up to this important conference. Your efforts have been well worth it. I am told that Frank's beard did not have a trace of grey in it until he started organizing this conference.

In addition to Frank and the Conference Steering Committee, I would also like to thank the numerous staff that volunteered their services for this event.

I would also like to pay special tribute to the conference's sponsors. Your financial support for this undertaking was most generous and we thank you very much.

Over the last three days, you have been bombarded with many thought-provoking views on Sustainable Development:

- varying opinions on -- What is it?
- what policies and processes are required to achieve it?
- how do you finance it?
- what does it mean to our various sectors like - Agriculture, Energy, Manufacturing and Fisheries.
- and how can we achieve Sustainable Development at a local, regional, national and international level?

In my closing remarks to you today, I did not want to go over the same territory that has already been covered. I thought I would use this opportunity to share with you some of my personal reflections on why Sustainable Development is an idea whose time has come.

I grew up in the North End of Winnipeg and I am sure, like many of you, I daydreamed of what the future would be like. The comic books and science magazines that we purchased at the nearby drug store predicted a bold new future.

The seventies and eighties would bring us space travel, a robot in every home, jet-propelled cars, two-way T.V. and a small pill that would replace a meal.

Well, the future hasn't quite turned out that way. Yes, we now have personal computers, organ transplants, high-tech communications, space shuttles and the like, but we have also become a world of polluted rivers, slime-covered beaches, overflowing garbage dumps, spreading deserts and withering forests.

It is obvious that "an environmental crisis is on our doorstep". All the danger signals are there. In fact, we don't have to look too far from this convention centre to the evidence of potential wholesale change occurring on our Prairies.

The drought in Western Canada over the last two years has painted us a dramatic picture of what the future may hold unless we fundamentally shift many of our economic and agricultural practices.

The '88 drought was the worst in Canada in over 50 years and the prospects for this year do not look much better, unless we get some much needed rain.

Last summer, our province was plagued with dust storms as the Prairie topsoil blew. This spring's weather patterns that have set our Province ablaze with forest, bush and grass fires, are already pointing to another drought, the seriousness of which cannot be overestimated.

It is estimated that in Western Canada alone, we now lose over 300 million tonnes of soil to erosion. The price tag for all this soil loss and degradation in Canada, as a whole, is now estimated to be over 1.4 billion dollars a year. So, as you can appreciate, the cost of the drought in both lost production and soil erosion is staggering.

It is not just our soil that is at risk here on the Prairies. The drought has also had a profound effect on our water resources. Underground aquifers across Western Canada have dropped noticeably in certain areas and some of our communities are facing severe water shortages. We can no longer live with the myth that we have a limitless supply of fresh water to draw upon. Water is going to be one of our most precious resources in the future.

The point that I am trying to make, is that you don't have to look too far afield, say to Africa, to see the warnings of Brundtland or the interdependence of the environment and the economy.

In Canada, we clearly have a self-interest in protecting our resource base. Over 40% of Canada's gross domestic product, 33% of our labour force and 52% of our exports can be directly related to economic activities which are dependent upon the environment. In many developing nations, the dependence is even greater.

So, protecting the environment makes good economic sense. But people have to see it that way before real progress can be made. Too often, people are more comfortable with old problems than new solutions. This is one of the reasons we have adopted broad-based, public consultations as part of the conservation strategy we are developing.

Clearly, the challenge and the opportunity now, is to make a major shift in our economic development practices so that they become sustainable.

Over the last three days, there have been numerous references to the Brundtland Commission Report.

I don't think it is an exaggeration to say that the Brundtland Commission Report is emerging as the new environment and development bible.

Not only does the report give us a frightening snapshot of our global decay -- but it offers us an exciting practical prescription for change. This is where the true breakthrough of the Brundtland Commission rests. Previous global warnings forecast doom but forgot that the future can be bright, if we are prepared to accept the challenge.

The Commission calls for a "new era of environmentally sound economic growth". This new growth must be based upon preserving our environment and resource base for future generations.

All development in the world must become both environmentally and economically sustainable.

I want to draw your attention to the commitment made by the Prime Minister of Canada at the United Nations General Assembly in September, 1988, when he committed the Government of Canada to establish, in Winnipeg, an international centre for Sustainable Development.

That announcement was greeted with enthusiasm and excitement not only in Manitoba but across Canada, North America and, indeed, it generated an amazing level of interest and support internationally from those concerned with Sustainable Development.

The reaffirmation of the Prime Minister's commitment in the recent Throne Speech renewed the enthusiasm amid the reports of the skeptics who feared this was to be an unfulfilled commitment.

As I mentioned earlier, Sustainable Development is an idea whose time has come. It is not just a relevant concept to government -- but it is particularly relevant to the private sector as well. Sustainable Development, in essence, means doing business more efficiently and effectively.

There are good economic reasons for change.

In my view, the private sector must accept the challenge laid out before it - and they have made a start.

If the private sector integrates its environmental and economic planning at the outset, it usually results in a much more efficient industrial process. It also avoids the exorbitant cleanup costs of the future. To "anticipate and prevent" is much more cost-effective than to "react and cure".

The Brundtland report also puts a heavy onus on governments to change the way they do business.

Unfortunately, governments have not been structured effectively to be pro-active in the area of environment-economy integration. Far too often, environmental protection has been a mere afterthought or an add-on.

This is starting to change. Canada's response to Brundtland and the National Task Force on Environment and Economy has emerged as a game plan to implement the concept of Sustainable Development.

The Task Force Report has been endorsed by all of Canada's First Ministers and it is now at various stages of implementation by the Federal, Provincial and Territorial Governments.

Here in Manitoba, we have taken the messages of both the Brundtland and Task Force Reports very seriously and to heart.

Sustainable Development is a major new policy thrust of our government. One of our central objectives is to design and implement a comprehensive Sustainable Development strategy for Manitoba. We talked about our agenda in yesterday's throne speech.

Here in Manitoba, we are moving on a number of fronts to advance the issue. To cite some examples:
No. 1 We have created a Manitoba Round Table on environment and economy which I chair.
No. 2 We have established a special Sustainable Development Committee of Cabinet, chaired by the Deputy Premier. To our knowledge, this is the first Cabinet Committee of its type in the country and for that matter, the world.
No. 3 We have also set up a new Sustainable Development Coordination Unit in Executive Council. This new unit will coordinate our activities pertaining to Sustainable Development; and
No. 4 We have initiated a Sustainable Development Policy Formulation process via a comprehensive soil, land and water strategy.

In addition, I have also made the Deputy Premier the Environment Minister, and we have moved to strengthen our environment department through additional resources. So, as you can see, we are taking the advice of both the Brundtland and Task Force Reports very seriously.

An international conference will be held in Winnipeg, in the Fall of 1990, to deal with the crucial issue of educating the next generation about the importance of Sustainable Development. By that time, it would be my hope that the International Centre for Sustainable Development in Winnipeg will have started to function as an ongoing source of expertise for the growing number of sustainable development initiatives throughout the world, including the critical issues of education.

I can assure you that these actions are just the beginning of our government's quest for Sustainable Development. We fully recognize the fact that it will be a complex and arduous road, but we feel it is vital to the long-term economic viability of our Province. In our view, Sustainable Development is the one and only option.

Last week, I spoke to the Canadian Institute of Resources Law in Ottawa on the legal aspects of Sustainable Development. The immediate challenge to industry is to begin the voluntary process of adopting Sustainable Development principles and not to wait for government to legislate, regulate, and enforce.

Indeed, many companies are finding that environmentally sound plants are efficient plants especially when what were previously considered waste products are now being reprocessed and sold for a profit.

In fact, I can see the day when industries will view jurisdictions that subscribe to Sustainable Development as desirable places to locate, that is, moving there "because of" and not "in spite of" environmental concerns.

The widespread interest in Sustainable Development provides a tremendous stimulus for a critical examination of the legal frameworks governing the use of our resources and the quality of our environment.

The environment assessment process is now achieving the political respectability and credibility that will enable it to become a truly central instrument for planning and decision-making.

Other intriguing legal and political issues are raised by the Brundtland Commission's endorsement of the concept of a Citizen's right to a clean environment. While one alternative is action on this front at the provincial level, it would seem that a longer term approach would lie in considering the constitutional entrenchment of environmental rights. This would again raise issues regarding the appropriate degree of political control over such processes. I believe that this debate would be healthy and productive.

In closing, I would like to emphasize that we must all steer a new course towards our environmental future. Sustainable Development must become central to Manitoba's and Canada's new vision of itself.

As the Task Force on Environment and Economy so boldly stated -- "Change is necessary, and it must occur now. Our children and grandchildren are depending upon us!"

Thank you very much and I hope you enjoyed our conference.

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CONFERENCE DELEGATES

David Abbott
Sr Community Studies Plann
Ontario Hydro
700 University Ave
Toronto, Ont M5G IX6

Marie Adam
Fed. Env. Assess Review Office
13th flr, Fontaine Bldg
Hull, P.Q. KIA OH3

K.R.F. Adams
Corp. Planning Officer
Manitoba Hydro
P.O. Box 815,
Winnipeg, Man R3C 2P4

Roy Aitken
Executive Vice-President
Inco Ltd.
Box 44, # 2200, Royal Trust Tow
Toronto, Ont M5K IN4

Arthur Allan
Land Use/Env. Chairman
Manitoba Wildlife Fed.
1770 Notre Dame Ave
Winnipeg, Man R3J IR9

Jamie Alley
Cabinet Officer
Cab. Secretariat, BC. Govt
Parl Bldgs,
Victoria, B.C. V8V IX4

Lorne Ames
Pres, Man Div
INCO Ltd
General Delivery
Thompson, Man R8N IP3

Per Andersen
Director
Alta Forestry, Lands & Wildlife
4th flr, 9920 - 108 St
Edmonton, Alta T5K 2C9

Carl Anderson
Dir, Plan & Dev
UMA Engineering Ltd
1479 Buffalo Pl
Winnipeg, Man R3T IL7

J.D. Anderson
Dir, Aquaculture & Comm Fi
Min of Agriculture & Fisheries
808 Douglas St
Victoria, B.C. V8W 2Z7

N.M. Anderson
Dir, Plann & Dev
Can Hydrographic Service
#211, 615 Booth St
Ottawa, Ont KIA OE6

Louanne Anderson
Winnipeg, Man

Michael Anderson
Research Director
Assembly of Man Chiefs
Winnipeg, Man

Gerry Andrews
Strat Plann & Ec Policy Ad
Ag. Can, Rsch Branch
7105-Sir John Carling Bldg
Ottawa, Ont

Don Andrews
Dir Performance Dev
Dow Chemical Can Inc
P.O. Box 1012
Sarnia, Ont N7T 7K7

Greg Arason
CEO
Man. Pool Elevators
P.O. Box 9800
Winnipeg, Man R3C 3K7

Dan Archer
Dir, Sustainable Dev
Man Industry Trade & Tourism
430-155 Carlton
Winnipeg, Man R3G IT1

Robert Arnot
Researcher/Analyst
Ont. Round Table
790 Bay St.
Toronto, Ont M5G IN8

John Ashton
Supt, Env. Control
INCO Ltd
General Delivery
Thompson, Man R8N IP3

Jim August
General Manager
Winnipeg Core Area Initiative
124 King St.`
Winnipeg, Man R3B IH9

Brian Bailey
Mineral Res. Planner
Man. Energy & Mines
555-330 Graham Ave
Winnipeg, Man R3C 4E3

E.A. Bailey
Engineering Advisor
Internat Joint Commission
100 Metcalfe St
Ottawa, Ont KIP 5M1

Michael Bailey
Steer Comm Member, Sus Dev
CBC Environmental Network
c/o 1916 E 3rd Ave, Mn flr
Vancouver, B.C. V5N IH5

Bill Balfour
Sr Consultant
Gartner Lee Ltd
140 Renfrew Dr, #102
Markham, Ont L3R 8B6

Arthur Ball
Chief Mining Engineer
Mines Br, Man. Energy & Mines
555-330 Graham Ave
Winnipeg, Man R3C 4E3

Michael Balshaw
Reg. Dir. Gen,
Atm. Env. Service, Env. Can.
1000-266 Graham Ave.
Winnipeg, Man R3C 3V4

Jay Barclay
Sr Env Policy Officer
Environmental Affairs, EMR
580 Booth St
Ottawa, Ont KIN OE4

William Bardswich
Director of Mines
Man. Energy & Mines
555-330 Graham Ave
Winnipeg, Man R3C 4E3

John Barker
Coord
Manitoba Eco-Network
P.O. Box 3125
Winnipeg, Man R3C 4E6

J. Barkley
Energy Mines & Res Canada
Ottawa, Ont

Bill Barto
Policy Analyst
Sust Dev Co-ord Br, Man Govt
Rm 14, Leg Bldg
Winnipeg, Man R3C OV8

Guy Beaumier
Economist
Library of Parliament
Parliamentary Library
Ottawa, Ont KIA OA9

John Bennett
Can Environment Indus Assoc
Vancouver, B.C.

David Besner
Exec Sec, Round Table
N.B. Dept Munic. Aff & Env.
P.O. Box 6000
Fredericton, N.B. E3B 5H1

Ash Bhasin
Mgr, Public Affairs
Gulf Can Resources Ltd
P.O. Box 130
Calgary, Alta T2P 2H7

Clifford Bird
Env. Ind. Div
Ind Trade & Tech Canada
235 Queen St
Ottawa, Ont KIA OH5

Bryan Blunt
Env. Officer
Manitoba Environment
Bldg 2, 139 Tuxedo Ave
Winnipeg, Man R3N OH6

Mieke Bos
Third Secretary
Netherlands Embassy
275 Slater St, 3rd flr
Ottawa, Ont KIP 5M9

Barry Briscoe
Mgr, Env Prot
Environment Canada
521-269 Main St.
Winnipeg, Man R3C IB2

Bill Barley
G.M., Flurocarbon Prod.
Du Pont Canada Inc.
Box 2200, Streetsville
Mississauga, Ont L5M 2H3

Robert Barton
Vice-Pres
INCO Ltd
General Delivery
Thompson, Man R8N IP3

Fred Belaire
Economist
Atomic Energy of Can, Rsch Co.
344 Slater St, 16th flr
Ottawa, Ont

Dr. C. Fred Bentley
Prof. Emeritus, Soil Sc.
University of Alberta
13103-66 Ave.
Edmonton, Alta T6H IY6

William Best
Chief, Map distr & Rem Sen
Man. Remote Sensing Centre
1007 Century St.
Winnipeg, Man R2J 3B9

Richard Bill
Int Prog Off, Inl Waters
Environment Canada
Inland Waters Directorate
Ottawa, Ont KIA IG2

William Blackburn
Analyst
Science Sector, ISTC
240 Sparks St, 8th flr, Twr 803
Ottawa, Ont KIA IAI

Dr. Tom Booth
Professor
U of Manitoba
505 Buller Bldg, U of M
Winnipeg, Man R3T 2N2

Francois Bregha
Dir, Policy Studies
Rawson Acdy of Aquatic Science
1 Nicholas St, #404
Ottawa, Ont KIN 7B7

Jacques Brisson
Sr. Adv, Env Ec, E P
Environment Can
351 St. Joseph Blvd. 15th flr
Hull, P.Q. KIA OH3

Charles Barrett
VP Business Research
Conference Board of Canada
255 Smyth Rd
Ottawa, Ont KIH 8M7

Jamie Bastedo
Sr. Policy Analyst
N.W.T. Renewable Resources
Box 1320
Yellowknife, N.W.T.

Fred Belaire
Economist
Atomic Energy of Canada
16th Fl., Slater St.
Ottawa, ON K1A 0S4

Lise Bernier
Chef interimaire
Environment Canada
1141 Route de l'eglishe
Ste Foy, P.Q. G1V 4H5

David Bezak
Section Head
Manitoba Environment
Bldg 2, 139 Tuxedo Ave
Winnipeg, Man R3N OH6

Dr. Alfred Birch
Exec Dir
Alta Water Resources Commission
#910-10045 111 St.
Edmonton, Alta T5K 2M5

John Blackwood
Consul Gen. of Canada
Can. Consulate General
701-4th Ave S., #900
Minneapolis, Minn 55415

Mark Boreskie
Policy Analyst
Sust Dev Co-ord Br, Man Govt
Rm 14, Leg Bldg
Winnipeg, Man R3C OV8

Creighton Brisco
Prov Coord, Round Table
N.S. Dept of the Environment
P.O. Box 2107
Halifax, N.S. B3J 3B7

Claude Brouillard
President
Can Petro Products Inst
275 Slater St, #1202
Ottawa, Ont KIP 5H9

Ray Brouzes
ALCAN Aluminum Co Ltd
Montreal, P.Q.

Dennis Brown
Sec Head, Water Standards
Manitoba Environment
Bldg 2, 139 Tuxedo Ave
Winnipeg, Man R3N OH6

Paul Brown
Associate
Nolan Davis & Assoc (NS) Ltd
6112 Quinpool Rd, 2nd flr
Halifax, N.S. B3L 4K9

Douglas Bruchet
Dir. Health, Safety, Env.
Can. Petroleum Assoc.
#3800, 150-6th Ave. S.W.
Calgary, Alta T2P 3Y7

Wayne Bryant
Regional Director
Energy Mines & Resources Can
1003-213 Notre Dame Ave
Winnipeg, Man R3B IN3

Lawrence Buhr
Reg Manager
MM Dillon Ltd
6 Donald St S
Winnipeg, Man R3L OK6

Don Burdeny
Director
Dangerous Goods Institute
115-79 Swindon Way
Winnipeg, Man R3P OX2

Dr Carole Burnham
Dir-Env
Ontario Hydro
700 University Ave, U16D5
Toronto, Ont M5G IX6

David Buzzelli
Chairman, Pres & CEO
Dow Chemical Canada Inc
P.O. Box 1012, Modeland Rd
Sarnia, Ont N7T 7K7

John Cameron
Spec Projects Officer
Environment Canada
Ottawa, Ont KIA OH3

Cameron Campbell
Sr. Govt Relat Analyst
Ontario Hydro
700 University Ave,H19 B12
Toronto, Ont M5G IX6

Donald Campbell
Planner
Reg Municipality of Niagara
Thorold, Ont L2V 4T7

R.L. Carter
83 Athlone Dr
Winnipeg, Man

Anthony Cassils
Vice-Pres
CFG Heward Investment Mgmt
630 Rene Levesque Bvd W,
Montreal, P.Q. H3B 1S6

Dr. Robert Caton
Vice-President
Concord Scientific Corp
2 Tippett Road
North York, Ont M3H 2V2

Jean-Yves Cayen
Analyste socio-economique
Service canadien des parcs
10 rue Wellington, 3e etage
Hull, P.Q. KIA OH3

Dr. Peter Chapman
Partner
EVS Consultants
195 Pemberton Ave
N. Vancouver, B.C. V6H IB2

Tim Cheesman
Princ. Planner
Sask. Rural Development
3130-8th St.E.
Saskatoon, Sask S7K 5E4

Terri W. Chiasson
Exec. Secretary of CORE
Environment Canada
Suite 700-1200 West 73rd Ave
Vancouver, BC R6P 6H9

W.J. Christie
Grt Lakes Rsch Coord
Ont Min. Natural Resources
RR #4,
Picton, Ont EOK 2TO

Ernest Cicierski
Science Curriculum Cons.
Manitoba Education
409 - 1181 Portage Ave.
Winnipeg, MB R3G OT3

David Clark
Head, Waste Mgmt
M.M. Dillon Ltd
Box 1850, Stn A
Willowdale, Ont M2W 6H5

Red Clarke
Mgr, Reg & Native Aff
Dept. of Fisheries & Oceans Can
501 University Cres
Winnipeg, Man R3T 2N6

Betty Collins
Resource Mgmt Consultant
Sask Env & Public Safety
3085 Albert St
Regina, Sask S4S OB1

Jan Collins
Dev Consultant
Industry Trade & Tourism Man
7-155 Carlton St.
Winnipeg, Man

Gordon Collis
Chief Process Eng
Simplot Canada Ltd
Box 940
Brandon, Man R7A 2H1

Lorne Colpitts
Dir of Wildlife
Man Dept Natural Resources
1495 St. James St
Winnipeg, Man R3H OW9

Barbara Connell
Consultant, Soc Impact
MHWMC
226-530 Century St.
Winnipeg, Man

Helene Conner-Lajambe
Doctor
C. d'analyse des Politiques Energ.
1599 Rue Bourdon
St.B de Mont., PQ J3V 4T6

Shirley Conover
Int. Program Coord
Dalhousie Univ./CEAC
Dalhousie U, 1312 Robie St.
Halifax, N.S. B3H 3E2

Doug Cook
Env. Affairs Mgr
Esso Petroleum Canada
55 St. Clair Ave W, Rm 3026
Toronto, Ont M5W 2J8

R.J. Cooke
President
Man. Hazardous Waste Corp
226-530 Century St.
Winnipeg, Man R3H OY4

James Cooney
Dir, Int & Public Affairs
Placer Dome Inc
PO Box 49330 Bentall P Stn
Vancouver, B.C. V7X IPI

Jose Pedro de Oliveira Costa
Professor
Env Plan, U of Sao Paulo
Sao Paulo, Brazil

Frank Cosway
Conference Coordinator
Manitoba Environment
960-330 St. Mary Ave
Winnipeg, Man R3C 3Z5

Raymond Cote
Assoc. Dir,
Res. & Env. Studies, Dalhousie U.
1312 Robie St.
Halifax,, N.S. B3H 3E2

Richard Cote
Policy Advisor
Forestry Canada
19th flr, 351 Boul-St-Joseph
Hull, Que KIA IG5

Richard Cote
Senior Policy Advisor
Forestry Canada
351 St. Joseph Blvd.
Hull, PQ K1A 1G5

Peter Croal
Geologist/Hydrogeologist
Indian Affairs
725-200 Sacre-Cocur Blvd
Hull, P.Q. J8X 1E1

Thor Cronshaw
Gen. Supt.
Abitibi Price Inc
Box 10
Pine Falls, Man ROE IMO

Hon Glen Cummings
Minister
Man Minister of Environment
Winnipeg, Man

Dr. Gavin Currie
Energy Mines & Resources Can
38, 580 Booth St.
Ottawa, Ont KIA OE4

Ted Curtis
Faculty of Engineering
University of Regina
Regina, SK S4S 0A2

Thomas d'Aquino
Pres & CEO
Business Council on Nat Issues
90 Sparks St, # 806
Ottawa, Ont KIP 5B4

Dr. Sandy D'Aquino
Head, Planning Div, Inl Wa
nvironment Canada
#502-1001 W Pender St
Vancouver, B.C. V6E 2M9

Ann Dale
Dir, Operations
Nat Round Table Secretariat
1 Nicholas, # 520
Ottawa, Ont KIN 7B7

Richard Dalon
ADM,
B.C. Ministry of Environment
810 Blanshard St., 4th flr
Victoria, B.C. V8V IX5

Zal Davar
Water Resources Economist
Environment Canada
4th flr, 45 Alderney Dr.
Dartmouth, N.S.

Bill Davidson
Policy Advisor
Govt of the NWT
Box 1320
Yellowknife, NWT XIA 2L9

Willem de Bakker
Planning Analyst
Manitoba Environment
960-330 St. Mary Ave
Winnipeg, Man R3C 3Z5

Brando de Paula
Market Analyst
XCAN Grain Ltd
800-360 Main St
Winnipeg, Man R3C 3Z3

Michael Decter
Partner in Charge
Peat Marwick Consulting Grp
1200-477 Portage Ave
Winnipeg, Man R3B 3H5

Dennis Deley
Planning Coord
Man Research Council (ITC)
1329 Niakwa Rd E
Winnipeg, Man R2J 3T4

Rene Desmarais
Gen Mgr
Tricil (Quebec) Inc.
6785 route 132
Ste Catherin, Quebec JOL IEO

Benedetto Di Zitti
Principal
Di Zitti Associates
79 Madison Ave`
Toronto, Ont M5R 2S3

Peter Dickey
Mgr, Safety & Env. Aff
Shell Canada Ltd
400 - 4th Ave.
Calgary, Alta T2P 2H5

Dr. Ian Dickson
Exec Dir, Man. Nat Res
Conservation Districts Auth.
711-330 Graham Ave
Winnipeg, Man R3C 4A5

Jennifer Dickson
Mgr, Intergovt Affairs
Munic of Metro Toronto
390 Bay St, 4th flr
Toronto, Ont M5H 3Y7

John Dillon
Mgr, Env. Affairs
Can. Manufacturers' Assoc
151 Sparks St, #812
Ottawa, Ont KIP 5E3

Gerard Divay
Sous-Ministre Adjoint
MIN. DE L'ENVIRONNEMENT
3900 Rue Marly
Quebec, Que GIX 4E4

Ross Dobson
Winnipeg, Man

Lee Doran
Box 542,
Wasaga Beach, Ont LOL 2PO

Bob Douglas
Gen Mgr
Keystone Agric Products
437 Assiniboine Ave
Winnipeg, Man R3C OY5

William Draper
Gen. Mgr
Wpg. Chamber of Commerce
500-167 Lombard Ave
Winnipeg, Man R3B 3E5

Stan Eagleton
Chair
Clean Environment Comm
Rm 550-500 Portage Ave
Winnipeg, Man R3C 3X1

Dave Ediger
Chief, Dangerous Goods
Manitoba Environment
Bldg 2, 139 Tuxedo
Winnipeg, Man

David Elgie
Sr Ind Tech & Trade Offic
ISTC
608-330 Portage Ave
Winnipeg, Man R3C 2V2

Barbara Elton
Winnipeg, Man

Hon Jim Ernst
Minister
Industry Trade & Tourism Man
358 Legislative Bldg
Winnipeg, Man R3C OV8

Mac Estabrooks
Park Supt.
Can. Parks Serv., Dept. Env.
Riding Mtn. National Park
Wasagaming, Man ROJ 2HO

Margaret Dochoda
Fishery Biologist
Great Lakes Fishery Comm
1451 Green Rd
Ann Arbor, Michigan 48105

Anthony Dorcey
Assoc. Prof
Westwater Rsch Centre, UBC
U of British Columbia
Vancouver, B.C. V6T IW5

Elizabeth Dowdeswell
Reg. Dir. Gen, Cons.& Prot
Environment Canada
25 St. Clair Ave. E., #600
Toronto, Ont M4T IM2

Jack Dubois
Man Eco-Network
Winnipeg, Man

Stan Eagleton
Chairperson
Clean Environment Commission
550-500 Portage Ave
Winnipeg, Man R3C 3X1

Felicity Edwards
Program Mgr
The Banff Centre
Box 1020
Banff, Alta TOL OCO

Hugh Eliason
Dep Minister
Man Industry Trade & Tourism
352-450 Broadway
Winnipeg, Man R3C OV8

Kenneth Emberley
Environmentalist
220 Queen St.
Winnipeg, Man R3J IK7

Susan Eros
Policy Analyst
Sust Dev Co-ord Br, Man Govt
Rm 14, Leg Bldg
Winnipeg, Man R3C OV8

Gilles Ethier
Pol Attache - Quebec Govt
Gouvernement du Quebec
1200, McGill College -22 flr
Montreal, Que H3B 4J8

Darwin Donachuk
Land & Water Strat Coord
Manitoba Natural Resources
1577 Dublin Ave
Winnipeg, Man R3E 3J5

Ken Dormuth
Director
Atomic Energy of Can. Ltd.
Whiteshell Nuclear Rsch. Est.
Pinawa, Man ROE ILO

Derek Doyle
ADM
Dept. Natural Resources, Man
Rm 800, 1495 St. James St
Winnipeg, Man

Peter Duinker
Assoc Prof, Forestry
Lakehead University
Lakehead University
Thunder Bay, Ontario P7B 5E1

David L Edgar
Exec Dire
Nat Water Research Institute
867 Lakeshore Rd
Burlington, Ont L7R 4A6

James Eldridge
Sec to Cabinet
Man Govt Intergovernmental Rel
42 Leg Bldg
Winnipeg, Man R3C OV8

Tanner Elton
Deputy Minister
Man. Dept. Environment
Rm 350,450 Broadway Ave.
Winnipeg, Man R3C OV8

Hon Harry Enns
Minister
Minister, Man Natural Resources
314 Leg Bldg
Winnipeg, Man

Linda Eryou
Vice Pres
Mid-Can Equipment Sales
1932 Brookside Blvd
Winnipeg, Man R3C 2E6

Gilles Ethier
Pol Attache
GOUVERNEMENT DU QUEBEC
Montreal, Que

Hon. Hugh Faulkner
Sec-Gen
Intern Chamber of Commerce
38, cours Albert 1er,
Paris, France 75008

Charles Ferguson
Director,
INCO Ltd
Box 44, Royal Trust Tower
Toronto, Ont M5K IN4

Hon Gary Filmon
Premier
Premier of Manitoba
Rm 204, Leg Bldg
Winnipeg, Man R3C OV8

A.D. Fitzgerald
Dir, Env. Affairs
Northern Telecom
3 Robert Speck Parkway
Mississauga, Ont L4Z 3C8

Reg Forbes
Consultant
Westarc Group Inc.
247 - 18th St.
Brandon, Man R7A 5A6

Frank Frantisak
V.P., Env. Services
Noranda Inc
PO Box 45, Commerce Crt W
Toronto, Ont M5L IB6

Peter Furlonger
First Secretary
Australian High Commission
50 O'Connor St
Ottawa, Ont KIP 6L2

Stuart Gale
Dir, Product & Planning
B.C. Tourism & Prov Sec
1117 Wharf St
Victoria, BC V8W 2Z2

Mary Galloway
Entomologeal Society of Man
Winnipeg, Man

Dr Marc Garneau
Dep Program Mgr
Can Astronaut Program
NRC, M-60 Montreal Rd
Ottawa, Ont KIA OR6

Michael Fay
Dir, Plan Prog & Dev
Can. Parks Service
457 Main St.
Winnipeg, Man R3B 3E8

Jim Ferguson
Research Coordinator
Biomass Energy Inst
1329 Niakwa Rd. E
Winnipeg, Man R2J 3T4

Rick Findlay
Director
Ontario Round Table
790 Bay St.
Toronto, Ont M5G IN8

Gerry Fitzsimmons
Dir, Nat Affairs Br, Corp
Environment Canada
10 Wellington St.
Hull, P.Q. KIA OH3

Gerald Forrest
Dep. Minister
Man. Dept. of Municipal Affairs
Rm 332, Leg. Bldg
Winnipeg, Man R3C OV8

Wayne Fraser
Dir. Safety & Environment
Hudson Bay Mining & Smelting Co
P.O. Box 1500
Flin Flon, Man R8A IN9

Frank Gaffney
Proj Director
N W Renew Res Centre
1133 Dexter Horton Bldg
Seattle, Wash 98104

Tom Galimberti
Exec Dir, Plan & Assess
Sask Env & Public Safety
3085 Albert St
Regina, Sask S4S OB1

Donald J. Gamble
Exec. Director
Rawson Acad. of Aquatic Sc
#404- One Nicholas St.
Ottawa, Ont KIN 7B7

Michel Gelinas
Fed-Prov Relations
59 Sparks St, Rm 406
Ottawa, Ont KIA OA3

Robert Fenton
President
Robert Fenton Assoc. Ltd
70 Cornish Ave
Winnipeg, Man R3C IA1

Craig Ferguson
Dir, Can-US Affairs
Environment Canada
10 Wellington St.
Hull, P.Q. KIA OH3

Hon. Glen Findlay
Minister
Man. Dept of Agriculture
165 Legislative Bldg
Winnipeg, Man R3C OV8

Ken Fockler
Mgr, Corp & Sc. Programs
IBM Can Ltd
3500 Steeles Ave. E, Dept 43/62
Markham, Ont LON ICO

John Foster
President
EDPRA Consulting Inc
355 Gilmour St
Ottawa, Ont K2P OR1

Rudy Friesen
Partner
Friesen Tokar Reynolds Architects
200-2033 Portage Ave
Winnipeg, Man R3J OK8

Edward Gale
Sr Policy Analyst
Dept of Fisheries & Oceans
11th flr, 200 Kent St
Ottawa, Ont KIA OE6

Gary Gallon
Sr. Policy Adv
Ont Ministry of the Environment
15th flr, 135 St.Clair Ave W..
Toronto, Ont M4V IP5

Barry Garbutt
Dean, Heath & Appl Sc
Red River Comm College
2055 Notre Dame Ave
Winnipeg, Man R3H OJ9

Edward George
Gen Mgr
Wpg Business Dev Corp
509-167 Lombard Ave
Winnipeg, Man R3B OV3

Kent Gerecke
Winnipeg, Man

Walter Giles
Assoc Dep Min
Ont. Min of Environment.
14th flr, 135 St. Clair Ave W
Toronto, Ont M4V 1P5

Colin Gillespie
Barrister & Solicitor
Taylor McCaffrey Chapman
9th flr, 400 St. Mary Ave
Winnipeg, Man R3C 4K5

Alan Glasgow
Sr. Resource Planner
Man. Natural Resources
711-330 Graham Ave
Winnipeg, Man R3C 4A5

Michael Goffin
Planning Coord
Env Canada
25 St Clair Ave E, 6th flr
Toronto, Ont M4T 1M2

Arthur Goodwin
Dir
Commerce & Technology
P.O. Box 6000
Fredericton, N.B. E3B 5H1

John Gorjup
Env. Scientist
National Energy Board
473 Albert St.
Ottawa, Ont KIA OE5

Howard Goshulak
Mgr, Ec Dev
Govt of Ontario
77 Bloor St W, 5th flr
Toronto, Ont

Michelle Gosselin
Chief, Socio-Ec Analysis
Environment Can
351 St. Joseph Blvd. 15th flr
Hull, P.Q. KIA OH3

Keith Grady
Indian & North Affairs Can
10 Wellington, Rm 1851
Ottawa, Ont KIA OH4

Mary Granskou
Fundraising Director
Friends of the Earth
251 Laurier Ave W, #701
Ottawa, Ont KIP 5J6

John Gray
Professor
U of Manitoba
U of M
Winnipeg, Man

Douglas Gregory
Public Affairs Spec.
IBM Canada Ltd
43/709 3500 Steeles Ave. E
Markham, Ont L3R 2Z1

Pierre Grenier
President
Stablex Canada Inc
760 Industrial Blvd
Blainville, P.Q. J7C 3V4

Diane Griffin
Executive Director
Island Nature Trust
P.O. Box 265
Charlottetow, P.E.I. CIA 7K4

Paul Griss
Exec Dir
Can. Nature Federation
453 Sussex Dr.
Ottawa, Ont KIN 6Z2

Sandy Griswold
Atlantic Can Opportunity Agy
Charlottetown, P.E.I.

Zack Gross
The Marquis Project
200, 107 - 7th St
Brandon, Man R7A 3S5

David Gural
V.P., Gen. Mgr.
Sussex Environmental Services
Gen. Delivery
Oak Bluff, Man

Rosanne Hahn
Consultant, Indust Dev
Ont Min of Ind Trade Tech
900 Bay St., Hearst Bl
Toronto, Ont M7A 2E1

Agnes Hall
Winnipeg, Man

Veena Halliwell
Project Coordinator
Can. Env. Adv. Council
10 Wellington St.
Hull, P.Q. KIA OH3

Laurence Haberman
Manitoba Research Council
4th flr, 155 Carlton
Winnipeg, Man

Robert Hamlin
Mgr, Telcontrol Dept
Manitoba Hydro
1140 Waverly St.
Winnipeg, Man R3C 2P4

Bob Hamlin
Manager, Tele-control Dept
Manitoba Hydro
Box 815, 1140 Waverly St.
Winnipeg, MB R3C 2P4

Dr. Wm T Hancox
V.Pres.
Atomic Energy Can. Rsch Co.
Whiteshell Nuclear Rsch Est.
Pinawa, Man ROE 1LO

Harry Harapiak
MLA, The Pas
MLA, The Pas
Leg Bldg, Rm 228
Winnipeg, Man R3C OV8

Harry Harapiuk
MLA, The Pas
NDP Caucus
Room 228 Legislative Building
Winnipeg, MB R3C 0V8

Kenneth Harley
Alt. Exec Dir
Interamerican Dev. Bank
1300 New York Ave. N.W.
Washington, D.C. 20577

William Harper
Gen Mgr
ID Systems Ltd
905 Waverley St
Winnipeg, Man R3T 5P4

Murray Hart
Secretary
WEEEC Conf '90
Box 1573
Neepawa, Man ROJ 1HO

David Hatch
Conserv Strategy Assoc of Man
Winnipeg, Man

Charles Hayles
PDA Inc
9 Roxborough St W
Toronto, Ont M5R 1T9

Charles Hayles
PDA Inc.
#2 - 102 Atlantic Ave.
Toronto, ON M6K 1X9

Mary Hegan
Health Promotion Direct.
Health and Welfare Canada
Room 468, Jeanne Mance Buid.
Ottawa, ON K1A 1B4

Lorna Hendrickson
Policy Analyst
Manitoba Environment
60-330 St Mary Ave
Winnipeg, Man R3C 3Z5

Prof Thomas Henley
Assist Dir
Nat Resources Instit
177 Dysart Rd
Winnipeg, Man R3T 2N2

Dr. David Henry
Associate Professor
SK Indian Federated Collage
CW-127, University of Regina
Regina, SK S4S 0A2

Lucie Heon
Spec. Adv to V.P.
CIDA
200 Promenade du Portage, 7th f
Hull, P.Q. KIA OG4

John Herity
D.G., Policy & Admin
Fed. Env. Assess Review Off.
13th flr, Fontaine Bldg
Hull, P.Q. KIA OH3

Bill Hews
Plant Manager
Northern Telecom
1455 Mountain Ave.
Winnipeg, Man R2X 2Y9

David Hicks
Vice-President
DS-Lea Consultants
Ste 111 - 93 Lombard Ave.
Winnipeg, Man. R3B 3B1

Conrad Hild
Chief of Staff
Sask Env & Public Safety
Rm 302-Leg Bldg
Regina, Sask S4S OB3

Garry Hilderman
Landscape Architect
Hilderman Witty Crosby Hanna
115 Bannatyne Ave. E
Winnipeg, Man. R3B OR3

Michael Hill
Peat Marwick Consulting Grp
Winnipeg, Man

Jennifer Hillard
President
Consumers Assoc of Canada
222 Osborne St
Winnipeg, Man R3L 1Z3

R.A. Hodge
Research Associate
Inst. For Public Policy
275 Slater St., 5th flr
Ottawa, Ont KIP 5H9

Susan Holtz
Sr Researcher
Ecology Action Centre
4 Umlah's Rd
Halifax, N.S. B3P 2G6

Russ Hood
V.P., Planning & Dev.
UMA Group
1479 Buffalo Pl.
Winnipeg, Man R3T 1L7

Ron Hopkinson
OIC, Sc Serv,
Atm. Env. Service, Env. Can
P.O. Box 4800
Regina, Sask S4P 3Y4

Gary Hosea
Mgr, Ind Tech & Trade
ISTC
608-330 Portage Ave
Winnipeg, Man R3C 2V2

Helen Howes
Senior Environment Advisor
Ontario Hydro
700 University Crescent
Toronto, ON M5G 1X6

Ron Humble
Man Industry Trade & Tourism
430-155 Carlton St
Winnipeg, Man R3C 3H8

Paul Hunt
Dir, Sust Dev
CIDA
200 Promenade du Portage, 7th f
Hull, P.Q. KIA OG4

Julian Inglis
Dept Indian & North Affairs
Ottawa, Ont

Colin Isaacs
Exec Dir
Pollution Probe
12 Madison Ave
Toronto, Ont M5R 2S1

Rudy Isaak
Principal
I.D. Engineering Can Inc
905 Waverley St.
Winnipeg, Man R3T 5P4

Raymond Ivany
Special Advisor
Atl Can Opportunities Agency
P.O. Box 6051
Moncton, N.B. EIC 9J8

Adrian Jackson
Head, Air Pollution Contro
Manitoba Environment
Bldg 2-139 Tuxedo Ave
Winnipeg, Man R3N OH6

Paul Jarvis
President
P.E. Jarvis & Assoc
93 Nassau St N
Winnipeg, Man R3L 2G9

David Jeans
Adm, Environment
Nfdl & Lab Env. & Lands
P.O. Box 4750,
St. John's, Nfdl AIC 5T7

Crawford Jenkins
N American Wildlife Foundation
Winnipeg, Man

Anil Jindal
Bus. Dev. Officer
Whiteshell Research (AECL)
Pinawa, Man ROE ILO

David Johns
Director, Prov Planning
Province of Manitoba
405-800 Portage Ave
Winnipeg, Man R3G ON4

David Johns
Director, Prov. Planning
MB Municipal Planning
4th Floor, 800 Portage
Winnipeg, MB R3G 0N8

Eric Johnson
Gen Mgr
BFI Waste Systems
P.O. Box 1590
Winnipeg, Man R3G 2Z6

David Johnston
Chair
National Round Table
1 Nicholas, # 520
Ottawa, Ont KIN 7B7

Linda Jolson
Vice Pres, Corp Relations
Manitoba Hydro
PO Box 815
Winnipeg, Man R3C 2P4

Charles Jones
Res. Mgmt Geologist
Man. Energy & Mines
555-330 Graham Ave
Winnipeg, Man R3C 4E3

Christof Kaufmann
Indust Planning Officer
City of Winnipeg
395 Main St
Winnipeg, Man R3B 3E1

Michael Keating
Environmental Writer & Consultant
10 Astor Ave.
Toronto, Ont M4G 3M2

John Keefe
Head, Plan & Conserv
Environment Canada
45 Alderney Dr., 4th flr
Dartmouth, N.S. R2Y 2N6

Dr. Geraldine Keeney-Wallace
Chairman
Science Council of Canada
100 Metcalfe St
Ottawa, Ont KIP 5M1

Danford Kelley
Engin & Sc Advisor
TD & TSB - Env. Can
Ottawa, Ont KIA OH3

Michael Kelly
Sr. Research Officer
Env. Council of Alta
8th Flr, Weber Centre
Edmonton, Alta T6K IP4

Brian Kelly
President
Marbek Resource Consultants
#407-2211 Riverside Dr
Ottawa, Ont KIH 7X5

Brian Kelly
Deloitte Haskins & Sells
Winnipeg, Man

Bill Kennedy
President
Wm Kennedy Consultants
177 Ethelbert St
Winnipeg, Man R39 1V8

Stephen Kensey
Exec. Dir
Land Cons. Council,
Level 15, 55 Lavender St
Milsons Pt.,, Australi 2060

Dianne Kent Gillis
Dir, Crown Lands Br
N.S.W.Govt N.B. Natural Res
P.O. Box 6000
Fredericton, N.B.

David Kidd
Man Council for Int'l Coop
60 Maryland St
Winnipeg, Man R3G IK7

Matthew Kiernan
Partner
Peat Marwick Consulting Grp
#1200- 447 Portage Ave
Winnipeg, Man R3B 3H5

John Kiss
Prov. Soils Specialist
Sask Agriculture & Food
3085 Albert St.
Regina, Sask S4S OB1

Larry Kratt
Dir, Env. Assess Branch
Sask Env & Public Safety
3085 Albert St
Regina, Sask S4S OB1

Jerry Kruk
VP, Operations
ICG Utilities
444 St. Mary Ave
Winnipeg, Man R3C 3T7

John Kubi
Exec Assist to Comm Plann
City of Winnipeg
510 Main St
Winnipeg, Man R3B 1B9

Dr. Emil Kucera
Sr. Environm. Planner
Man. Hazardous Waste Mgmt Corp
226-530 Century
Winnipeg, Man R3H OY4

Linton Kulak
Dir, Health Safe & Env.
Shell Canada Ltd.
400 - 4th Ave.
Calgary, Alta T2P 2H5

Dr Louis La Pierre
Chair, Env Council of N.B.
University of Moncton
Biol Dept, U of Moncton
Moncton, N.B. EIA 3E9

Claude-Andre Lachance
Mgr, Public Issues
Dow Chemical Can. Inc.
Modeland Rd., P.O. Box 1012
Sarnia, Ont N67 5M6

Gregory Lacomy
Acting Dep. Min.
Man. Dept of Agriculture
159 Legislative Bldg
Winnipeg, Man R3C OV8

Dr. Vera Lafferty
Dir General
Env Prot Br/COGLA
355 River Rd, Twr B, Rm 1622
Ottawa, Ont

Lester Lafond
Pres
Internat Mgmt Inc
701-230 22nd St E
Saskatoon, Sask L7K OE9

Raymond Lamoureux
Principal
Sustainable Development
34 Cranston Ave
Dartmouth, N.S.

Peter Larkin
U Professor
U of British Columbia
2204 Main Mall, UBC
Vancouver, B.C. V6R 2A9

Annick Le Henaff
Rsch Officer
Sust Dev, Environment Can.
351 St. Joseph Blvd, 10th flr
Hull, P.Q. KIA OH3

Peter LeBlanc
Exec. Secretary
Environment Canada
5th flr, 45 Alderney Dr.
Dartmouth, N.S. B2Y 2N6

Patrice LeBlanc
Director, Research
FEARO
200 Sacre-Coeur Blvd
Hull, P.Q. KIA OH3

Gary Leitch
Atomic Energy of Can
Gen Delivery
Pinawa, Man ROE ILO

Donald Leitch
Clerk of Exec Council
Province of Manitoba
215 Leg Bldg
Winnipeg, Man R3C OV8

Donna Leith
Director
Rawson Acad. of Aquatic Sc
#404- One Nicholas St.
Ottawa, Ont KIN 7B7

Patrick Lennon
Mgr, Env. Ind Div
Ind Trade & Tech Canada
235 Queen St
Ottawa, Ont KIA OH5

Myrt Lenton
Ex-Sec
Can. Bison Association
Box 264
Miami, Man ROG IHO

Kingsley Lewis
Coord, Prov. Cons. Strat
Prov. of P.E.I.
Box 2000
Charlottetow, P.E.I. CIA 7N8

William Lightowlers
Vice-Pres, Indust. Serv
ZENON Environmental Inc
845 Harrington Court
Burlington, Ont L7N 3P3

Douglas Lindores
Sr VP
Canadian Internat Dev Agency
200 promenade du Portage
Hull, P.Q. KIA OG4

Larry Loreth
Research Planner
City of Wpg, Env Planning
395 Main St
Winnipeg, Man R3B 3EI

Joe Lotzkar
Pres
Pacific Metals Ltd
8360 Ontario St
Vancouver, B.C V5X 3E5

Ruth Lotzkar
Chairman
Env Sound Packaging Coalition
c/o 7195 Selkirk St
Vancouver, B.C. V6P 6J4

Greg Lyle
Princ. Sec to Premier
Exec. Office, Govt of Manitoba
215 Leg Bldg
Winnipeg, Man R3C OV8

Marilyn MacDonald
Sr Sc Procurement Officer
Supply & Services Canada
12 C 1, Phase III, Place du Por
Hull, P.Q. KIA OS5

Jim MacLean
A/Director, Fisheries
Ont Min of Nat Resources
Rm 3440, 99 Wellesley St
Toronto, Ont M7A IW3

John MACLELLAN
Economist
Environment Canada
45 Alderney Dr
Dartmouth, N.S. B2Y 2N6

Dr. Cameron MacLeod
Dir, Sust Dev
Fisheries & Oceans Canada
200 Kent St
Ottawa, Ont KIA OE6

Jerry MacNeil
Exec Director
Man Assoc School Trustees
191 Provencher Blvd
Winnipeg, Man R2H OG4

Dr. John Mallea
Pres & Vice-Chancellor
Brandon University
270-18th St
Brandon, Man R7A 6A9

Dr Diane Malley
Sect Mgr,
Dept Fisheries & Oceans
501 University Cres
Winnipeg, Man R3T 2N6

Dr. Edward Manning
Chief, Conserv. Strat
Environment Canada
351 St. Joseph
Hull, P.Q. KIA OC7

David Marshall
Dir, Pac, West N Reg
FEARO
510-750 Cambie St
Vancouver, B.C.

Vinod Marwaha
Corp. Advisor
Environment Canada
210, 4999-98th Ave.
Edmonton, Alta T6B 2X3

Kerry Mattila
Manager
PACE
275 Slater St
Ottawa, Ont K1P 5H9

Rod McCormick
Recycling Coord
Manitoba Environment
Bldg 2, 139 Tuxedo
Winnipeg, Man

Ruth McKechnie
Sec. Hd, Policy & Strat
Environment Canada
351 St. Joseph Blvd, 10th flr
Hull, P.Q. K1A OH3

Larry McMillan
Sr. V.P.
Reid, Crowther & Partners
1150 Waverly St
Winnipeg, Man R3T OP4

Tim McTiernan
Dir, Policy & Planning
Govt. of Yukon
P.O. Box 2703
Whitehorse, Yukon Y1A 2C6

Mel Miller
Resource Planner
Alberta Agriculture
7000-113 St.
Edmonton, Alta T6H 5T6

Stewart Morrison
Exec. V.P.
Ducks Unlimited Can.
1190 Waverley St
Winnipeg, Man R3T 2E2

Clare Moster
ADM Energy
Manitoba Energy and Mines
555-330 Graham Ave
Winnipeg, Man R3C 4E3

Wayne Neily
Man. Environmental Council
550-500 Portage Ave
Winnipeg, Man R3C 3X1

Jacob Nickel
Land Resource Specialist
Man. Dept of Agriculture
27-2nd Ave SW
Dauphin, Man R7N 3E5

Arthur Mauro
Chief Exec Officer
Investors Group Inc.
One Can Centre, 447 Portage
Winnipeg, Man R3C 3B6

John McGuire
Dir, Reg Bus Dev
Man. Rural Development
5-155 Carlton St.
Winnipeg, Man R3C 3H8

Lee McKibben
Head, Land Use Br
Alberta Government
9820 - 106 St
Edmonton, Alta T5K 2J6

Hon Tom McMillan
Chairman
Can Chamber of Commerce,
55 Metcalfe
Ottawa, Ont K1P 6N4

Grant McVicar
Sr. Planning Analyst
Man Energy & Mines
555-330 Graham Ave
Winnipeg, Man R3C 4E3

Doug Miller
Pres
Synergistics Consulting Ltd
54 Berkeley St, 4th flr
Toronto, Ont M5A 2W4

Lance Morrison
Gen Mgr
Man Soft Drink Recycling Inc
Unit 1, 20 Bentall St
Winnipeg, Man R2X 3A8

Hasu Naik
Sr. Water Resources Planne
Environment Can. (Inland Waters)
1901 Victoria Ave.
Regina, Sask S4P 3R4

Dr. T.G. Neraasen
Chief Biologist
Ducks Unlimited Canada
1190 Waverley St.
Winnipeg, Man R3T 2E2

Lloyd Nilsen
Pres & CEO
Hudson May Mining & Smelting
200-3 Lombard Pl
Winnipeg, Man R3B OY4

Gail McBride
Dir, Services
B.C. Trade Dev. Corp
750 Pacific Blvd S.
Vancouver, B.C. V6B 5E7

Marv McKay
Div Mgr, Ext Relations
Manitoba Hydro
PO Box 815
Winnipeg, Man R3C 2P4

Don McMaster
Chairman
Man. Habitat Heritage Corp
306 Brock St.
Winnipeg, Man R3N OY9

Bob McNabb
Man & N Dak Zero-Tillage
Minnedosa, Man

Herb Middlestead
President
Winnipeg Chamber of Commerce
500-167 Lombard Ave
Winnipeg, Man R3B 3E5

Stanley Moore
Sr Dev Off., Indonesian Pr
CIDA
200 Promenade du Portage
Hull, Que K1A OG4

Karen Mosher
Fed-Prov Relations
59 Sparks St, Rm 406
Ottawa, Ont K1A OA3

Grant Nazarko
Prod Manager
Blackwoods Beverages Ltd
1850 Ellice Ave
Winnipeg, Man R3H OB8

Wint Newman
Manager
Mining Assoc of Man
700-305 Broadway
Winnipeg, Man R3C 3J7

Keith Nuttall
Dir, Geochem & Waste Immob
Whiteshell Nuclear Rsch Est
Pinawa, Man ROE 1LO

Peter O'Hara
Sr. SOE Advisor
Environment Canada
10 Wellington St.
Ottawa, Ont KIA OH3

Kevin O'Neil
Assoc Planner
Alberta Environment
9th flr, 9820 - 106 St
Edmonton, Alta T5K 2J6

Bryan Oborne
Sust Dev Coord Unit
305-155 Carlton St
Winnipeg, Man

Ken Ogilvie
Executive Director
Can. Env. Adv. Council
10 Wellington St.
Hull, P.Q. KIA OH3

Beatrice Olivastri
Nat Survival Institute
Ottawa, Ont

Dr. Edward Onyebuchi
Policy Analyst
Sust Dev Co-ord Br, Man Govt
Rm 14, Leg Bldg
Winnipeg, Man R3C OV8

Carl Orcutt
Dir, Env Control Services
Manitoba Environment
Box 7, 139 Tuxedo Ave
Winnipeg, Man R3N OH6

Ronald Orr
Coord, Metallurg Studies
INCO Ltd
General Delivery
Thompson, Man R8N IP3

Tom Owen
Intergroup Consultants Ltd
604-283 Portage Ave
Winnipeg, Man R3B 2B5

Sherrill Owen
Industy Science & Tech Can
235 Queen St
Ottawa, Ont KIA OH5

E.T. Owens
A/Assist Dep MInister
N.B. Dept Nat Res & Energy
P.O. Box 6000
Fredericton, N.B. E3B 5H1

Timothy Page
Director, Focus 2000
Can Chamber of Commerce
1160-55 Metcalfe St
Ottawa, Ont KIP 6N4

Robert Page
Chairman
Can Env. Advisory Counci
Env Studies, Trent U
Peterborough, Ont K9J 7B8

Myles Parsons
VP, Pacific Region
Klohn Leonoff Ltd
10180 Shellbridge Way
Richmond, B.C. V6X 2W7

Murray Paterson
Supervisor, Planning
Ontario Hydro
700 University Ave (Rm H10G3)
Toronto, Ont M5G 1X6

John Paulsen
V.P., Internat Div
Wardrop Engineering Inc
300-77 Main St.
Winnipeg, Man R3C 3H1

Peter Pearse
Prof
Univ of British Columbia
6450 Elm St
Vancouver, B.C. V6N 1B3

Wayne Pepper
Dir, Integrated Res Policy
Sask Parks Rec & Culture
3211 Albert St
Regina, Sask S4S 5W6

Robert Petri
VP & Reg Mgr
UMA Engineering Ltd
1479 Buffalo Pl
Winnipeg, Man R3T 1L7

Hugh Phillips
Exec Dir
SEEDS Foundation
#440-10169 104 St
Edmonton, Alta T5J 1A5

Kenneth Piddington
Director, Env. Dept
World Bank
1818 H St NW, Rm S5029
Washington, D.C. 20433

Ken Plews
Manitoba Environment
Bldg 2, 139 Tuxedo Ave
Winnipeg, Man R3N OH6

Bill Podolsky
Exec Dir
Manitoba Natural Resources
500-191 Broadway
Winnipeg, Man

Hartley Pokrant
Remote Sens Technologist
Remote Sensing Centre
1007 Century St.
Winnipeg, Man R2J 3B9

Jim Potton
Dir Communic, Econ & Plann
Man. Natural Resources
1495 St. James St.
Winnipeg, Man

Ted Poyser
Consultant
Winnipeg, Man

Robert Prescott-Allen
Partner
PADATA
627 Aquarius Rd, RR2
Victoria, B.C. V9B 5B4

Patricia Preston
Director, Corp. Affairs
C-I-L Inc.
P.O. Box 200, Stn A
North York, Ont M2N 6H2

Tom Pringle
ADM, Ag Dev & Mkt
Manitoba Agriculture
8th flr, 405 Broadway Ave
Winnipeg, Man R3C 3L6

Alex Pursaga
Sectoral Off-Services
West Ec Diversification
712-240 Graham Ave
Winnipeg, Man R3C OJ7

Doug Ramsey
Limnologist
Aggasiz North Associates
1214-B Chevrier Blvd
Winnipeg, Man R3T 1Y3

C.D. Rannard
Dir. of Forestry
Man. Natural Resources
300-530 Kenaston Blvd
Winnipeg, Man R3N 1Z4

Alexander Rattray
Prof, & Head
U of Man, Landscape Arch
U of Manitoba
Winnipeg, Man R3T 2N2

Roy Read
Dir of Marketing
I.D. Engineering Can Inc
905 Waverley St.
Winnipeg, Man R3T 5P4

Robert Redhead
Dir, Govt Relations (Can)
Tricil Ltd.
89 Queensway West
Mississauga, Ont L5B 2V2

William Rees
Assoc Prof, Comm& Reg Plan
U of British Columbia
6333 Memorial Rd
Vancouver, B.C. V6T 1W5

George Rempel
Special Projects Engineer
Wardrop Engineering Inc
77 Main St.
Winnipeg, Man R3C 3H1

A.P. Reuvers
Mgr, Risk Mgmt
Novacor Chemicals Ltd
P.O. Box 2535, Stn M
Calgary, Alta T2P 2N6

Alan Richards
Ext Aff Coord
Man. Hazardous Waste Corp
226-530 Century St.
Winnipeg, Man R3H OY4

Nigel Richardson
Principal
N.H. Richardson Consulting
203 Old Orchard Grove
Toronto, Ont M5M 2E6

Dorothy Richardson
Exec Dir
Nat Round Table Secretariat
1 Nicholas, # 520
Ottawa, Ont K1N 7B7

John Richardson
VP, Bus Dev
Chem-Security Ltd
501-100 Park Royal
W Vancouver, B.C.

Guy Rivard
Minister, Quebec Govt
GOUVERNEMENT DU QUEBEC
1200, McGill College, 22 flr
Montreal, Que H3B 4J8

Hon Guy Rivard
Minister of Technology
GOUVERNEMENT DU QUEBEC
Montreal, Que

Ray Rivers
Head, Plann Div
Environment Canada
867 Lakeshore Rd, Box 5050
Burlington, Ont L7R 4A6

Jane Robertson
Market & Sales REp
Gen Scrap & Car Shredder
P.O. Box 39, Transcona
Winnipeg, Man R2C 2Z5

Ray Robinson
FEARO
Ottawa,, Ont

Nick Roe
Principal
Nicholas Roe & Assoc.
#200-222 16th Ave N.E.
Calgary, Alta TZE 1J8

Ernest Roots
Sc Advisor
Dept of Environment, Canada
Office of Sc Advisor, EC
Ottawa, Ont K1A OH3

Fred Dr. Roots
CEARC
Hull, P.Q.

Peter Rosenfeld
Dev Officer
Man. Industry, Trade & Tourism
5-155 Carlton St.
Winnipeg, Man R3C 3H8

Jim Ross
Nfdl & Labr Conserv Strat Assoc
Box 11, Site 76
St. John's, Nfld A1C 5H4

Dr. Stan Rowe
Vice Chair
Can Env Adv Council
18 Kirk Cres
Saskatoon, Sask S7H 3B2

Douglas Russell
Sr. Policy Advisor
Atmosph Env., Env Can
27th flr, Terrasses de la Chaud
Hull, P.Q. K1A OH3

Hugh Russell
Assoc Dir
Foundation for Int'l Training
1262 Don Mills Rd, #200
Don Mills, Ont M3B 2W7

John Sadler
605-250 Wellington Cres
Winnipeg, Man R3M OB3

Tim Sale
ADM Education
Manitoba Education
311-1181 Portage Ave
Winnipeg, Man R3G OT3

Dr Emil Salim
Govt of Indonesia

Phil Sanderson
Ec Dev Coord
Corp. of Burnaby, B.C.
4949 Canada Way
Burnaby, B.C. V5G 1M2

Garry Schaefer
Reg. Chief, Sc. Services
Atm. Env. Service, Env. Can.
1000-266 Graham Ave.
Winnipeg, Man R3C 3V4

Herbert Schellenberg
Ag Res Economist
Manitoba Agriculture
915-401 York Ave
Winnipeg, Man R3C OP8

Gus Schindel
Mgr, Env. Affairs
Esso Resources Can. Ltd
237-4th Ave. S.W.
Calgary, Alta T2P OH6

Hans Schneider
U N Assoc in Canada
1777 Grant Ave
Winnipeg, Man R3N OM9

Rolf Schoenert
Sr. Env, Fish & Aquat Spec
Agrodev Canada
600-222 Somerset St W
Ottawa, Ont K2P 2G3

Julia Schtivelman
Spec Assist
Foundation for Int'l Training
1262 Don Mills Rd, #200
Toronto, Ont M3B 2W7

Rodger Schwass
York U, Env. Studies
71 The Kingsway
Toronto, Ont M8X 2T3

Michael Scott-Harston
CIDA
Hull, P.Q.

Ron Searles
Assist Dep Minister
N.B. Munic Affairs & Env
PO Box 6000
Fredericton, N.B. E3B 6C4

Jacinthe Seguin
Prog Officer
Can Council Res & Env Ministers
4905 Dufferin St
Downsview, Ont M3H 5T4

Terence Sellen
Sr. Trade Plann & Dev Offi
Western Econ. Diversification
Box 777
Winnipeg, Man R3C 2L4

Terry Sellen
Senior Trade Plan. & Dev.
Western Economic Diversification
Box 777
Winnipeg, MB R3C 2L4

Todd Sellers
Rawson Academy Aquatic Science
Ottawa, Ont

Nola Seymoar, PhD
Dir-Gen, Policy & Coord
Environment Canada
10 Wellington St
Ottawa, Ont KIA OH3

Bill Shaw
Dep. Director
Red Deer Reg. Planning Comm
2830 Bremner Ave
Red Deer, Alta T4R 1M9

Dave Shefford
Mgr, Process Tech
INCO Ltd
General Delivery
Thompson, Man R8N 1P3

Diane Shefford
Thompson, Man

Wesley Shennan
Sr. Planner
Edmonton Metro Reg. Plan Comm
9th flr, 10303-Jasper Ave
Edmonton, Alta T5J 3N6

Leonard Siemens
Prof & Assoc Dean
U of Manitoba
W311 Agric Bldg, U of Man
Winnipeg, Man R3T 2N2

Harry Siemens
Communic Specialist
Man Natural Resources
1577 Dublin Ave
Winnipeg, Man R3E 3J5

Glenn Sigurdson
Barrister & Solicitor
Taylor McCaffrey Chapman
9th flr, 400 St. Mary Ave
Winnipeg, Man R3C 4K5

David Simpson
Exec Dir
Cons Assoc of Canada
P.O. Box 9300
Ottawa, Ont KIG 3T9

William Sinclair
Sr Plicy & Ec Adv.
C & P, Env. Canada
5th flr, Kapilano 100, Park Roy
W. Vancouver, B.C. V7T 1A2

Dr. Sobharam Singh
ADM (Minerals)
Man. Energy & Mines
555-330 Graham Ave
Winnipeg, Man R3C 4E3

Scott Slocombe
Researcher
Sust Society Proj, U Waterloo
U of Waterloo
Waterloo, Ont N2L 3G1

Dr. Peter Sly
Dir, Sc. Program
Rawson Acad. of Aquatic Sc
#404- One Nicholas St.
Ottawa, Ont KIN 7B7

Vaclav Smil
Professor
University of Manitoba
Winnipeg, Man

Roger Smith
Board Member
Man. Habitat Heritage Corp
3011 Park Ave
Brandon, Man R7B 2K3

William Smith
Science Adviser
Science Council of Canada
100 Metcalfe St
Ottawa, Ont KIP 5M1

Edi Smockum
Municipality of Metro Toronto
Toronto, Ont

Ian Smyth
President
Canadian Petroleum Assoc
3800,150- 6 Ave SW
Calgary, Alta T2P 3Y7

Bob Sopuck
Policy Analyst
Sust Dev Co-ord Br, Mb Govt
Rm l4, Leg Bldg
Winnipeg, Man R3C OV8

Jerry Spiegel
Dir, Planning Rsch & Eval
Manitoba Environment
960-330 St. Mary Ave
Winnipeg, Man R3C 3Z5

Mira Spivak
Senator
Senate of Canada
703 Wellington Cres
Winnipeg, Man R3M OA7

Senator Mira Spivak
Senate of Canada
Winnipeg, Man

Peter Squire
Communications Dir
Manitoba Environment
020-330 St. Mary Ave
Winnipeg, Man R3C 3Z5

S. Stanley
Atomic Energy of Canada Ltd.
344 Slater St.
Ottawa, ON K1A 0S4

Mark Stefanson
Policy Analyst
Sust Dev Co-ord Br, Man Govt
Rm l4, Leg Bldg
Winnipeg, Man R3C OV8

Helen Steinkopf
203 Oxford St
Winnipeg, Man R3M 3H8

Dick Stephens
Sp Projects Officer
Manitoba Environment
Bldg 2, 139 Tuxedo Ave
Winnipeg, Man R3N OH6

Dale Stewart
Dep. Minister
Dept. Natural Resources, Man.
Rm 314, Leg Bldg
Winnipg, Man

Bob Stewart
President
Terrestrial & Aquatic Env Mgrs
Box 2647
Melville, Sask SOA 2PO

Don Stewart
Analyst
Industy Science & Techn Can
235 Queen St
Ottawa, Ont KIA OH5

Don Stewart
Analyst, Gen. Bus. Pol.
Ind. Science & Tech. Canada
235 Queen Street
Ottawa, ON K1A 0H5

Elmer Stobbe
Professor
Plant Sc, U of Manitoba
U of Manitoba
Winnipeg, Man R3T 2N2

Hon. Bruce Strachan
Min. State, Cariboo Reg.
B.C. Government
Rm. 326, Parliament Bldgs
Victoria, B.C. V8V IX4

Larry Strachan
Chief, Env Control Program
Manitoba Environment
Bldg 2-139 Tuxedo Ave
Winnipeg, Man R3N OH6

William J Strath
President
Man. Pool Elevators
Box 9800, 220 Portage Ave
Winnipeg, Man R3C 3K7

Maurice Strong
Chairman
Stovest Holding Inc
72 Chamberline Ave
Ottawa, Ont KIS OV7

Bruce Stubbs
Head, Habitat Protection
Alta Fish and Wildlife Div
9945-l08 St.
Edmonton, Alta T5K 2G6

Mayor Sylvia Sutherland
Mayor
Corp. of the City of Peterborough
500 George St. N.
Peterborough, Ont K9H 2R2

Hon. Herb Swan
Minister
Minister, Sask Env & Public Safet
Rm 302-Leg Bldg
Regina, Sask S4S OB3

Alan Sweatman
Hudson Bay Mining&Smelting
Winnipeg, Man

Lorraine Sweatman
Winnipeg, Man

Jeanne Tait
Sr Policy Planner
Govt of New Brunswick
P.O. Box 6000
Fredericton, N.B. E3B 5H1

Harold Taylor
MLA-Wolseley
Govt. of Manitoba
Rm 234, Leg Bldg
Winnipeg, Man R3C OV8

Michele Taylor
Environment Canada
CEPA Office, l8th flr
Ottawa, Ont KlA OH3

Ed Tchorzewski
Sask Env. Critic
Sask NDP Party Caucus
265 Leg Bldg
Regina, Sask S4S OB3

Bertrand Tetreault
President
Quebec Council for Cons & Env.
800-D'Youville, l9th flr
Quebec, P.Q. GIR 3P4

Bertrand Tetreault
President
PQ Council for Conservation & Env.
19th Floor, 800 d'Youville
Quebec City, PQ G1R 3P4

Dr. Stanley Thatcher
President
Atomic Energy of Can. Ltd. (Rsch)
344 Slater St.
Ottawa, Ont K1A OS4

Katherine Thibault
Water Quality Objectives O
Environment Canada
10 Wellington St.
Hull, P.Q. KIA OH3

William Thiessen
Division Manager
Laidlaw Waste Systems Ltd.
70 Paramount Rd.
Winnipeg, Man R2X 2W3

Dave Thompson
Head, Waste Mgmt
Manitoba Environment
Bldg 2-139 Tuxedo Ave
Winnipeg, Man R3N OH6

Diane Thompson
VP Resource INfo Services
Intera Technologies
2500-101 6 Ave SW
Calgary, Alta

Donovan Timmers
City Councillor
City of Winnipeg
510 Main St.
Winnipeg, Man

Mark Toivanen
Chairman & CEO
Sanivan Group Inc.
#1705-3rd Ave. P.A.T.
Montreal, P.Q.

Jim Tokarchuk
A/Chief, Soil & Water mgmt
Manitoba Agriculture
915-401 York Ave
Winnipeg, Man R3C OP8

His Excellency Tomusange
High Commissioner
Uganda High Commission
231 Cobourg St.
Ottawa, Ont KIN 8J2

Yves Tournois
Directeur
Fisheries & Oceans
200 Kent St, Stn 1456
Ottawa, Ont KIA OE6

Albin Tremblay
Dir, Direction Analyse
Environnement Canada
C.P 10, 100 Succursale Ste-Foy
Saine-Foy, P.Q. GIV 4H5

Bill Trotter
Sr Environm Analyst
Public Works Canada
Sir Charles Tupper Bldg, Rm C-4
Ottawa, Ont K2C IT2

Chris Trumpy
DIr, Ec Dev Br
Treasury Board, BC Govt
103-617 Government St
Victoria, B.C.

Chris Trumpy
Dir, Ec Dev Br
Treasury Bd, Govt of B.C.
#103-617 Government St
Victoria, B.C.

Dr Sari Tudiver
Policy & Prog Officer
Man Council for Int'l Coop
60 Maryland St
Winnipeg, Man R3G IK7

Mary Ann Turcke
Engineer
W.F. Baird & Assoc
38 Antares Dr, #150
Ottawa, Ont K2E 7V2

Richard Turkheim
Sr. Rsch Officer
Sask N Affairs Sec
Box 3003-McIntosh Mall
P. Albert, Sask S6V 6Z2

Dr. John Underwood
Env. Analyst
Nova Scotia Environment
Box 2107
Halifax, N.S. B3J 3B7

Robyn Usher
Biologist
Alta Conserv. Strat. Steer Comm
#1-715 6th St N.E.
Calgary, Alta T2E 6X2

Evhan Uzwyshyn
Science Curriculum Consult
Manitoba Education
409 - 1181 Portage Ave.
Winnipeg, MB R3G 0T3

Jean Vachon
Coord au Sec de la Table R
MINISTERE DE L'ENVIRONNEMENT
3900 Rue Marly
Quebec, Que GIX 4E4

Aivo Veel
Mgr, Market Services
Ont Waste Mgmt Corp
2 Bloor St W
Toronto, Ont M4W 3E2

Ann Verschuer
Director
Soc Impacts Unit/Australia
197 St. Georges Tge
Perth, W. Austr 6000

Hajo Versteeg
Chairman
Pest Management Advisory Board
Rm. 701, 171 Slater St.
Ottawa, Ont K1P 5H7

Charles Wagaba
Uganda High Commission
Ottawa, Ont

David Waldman
The Conserver Grp Inc
356 Hargrave St.
Winnipeg, Man R3B 2J9

Phil Walker
Commission Member
Alta Water Resources Comm
#910-10045 - 111 St
Edmonton, Alta T5K 2M5

Dennis Wallace
ADM,
Western Economic Diversification
712-240 Graham Ave
Winnipeg, Man R3C 2L4

Glenn Warner
Box 820
Yellowknife, NWT X1A 2T2

Susie Washington
President
West. Environmental & Social Tren
501, 736-6th Ave SW
Calgary, Alta T2P OT7

Art Webb
Govt of Yukon
Whitehorse, Yukon

Dr. Barrie Webster
Commissioner
Clean Env. Commission
550-500 Portage Ave
Winnipeg, Man R3C 3X1

Art Webster
Minister of Nat Resources
Govt of Yukon
Box 2703
Whitehorse, Yukon YIA 2C6

G.D. Webster
Dir, Soils & Crops
Manitoba Agriculture
903-401 York Ave
Winnipeg, Man R3C OP8

Philip Weiss
Resource Planner
Man. Natural Resources
711-330 Graham Ave
Winnipeg, Man R3C 4A5

Danielle Wetherup
V.P., Prof Services
CIDA
200 Promenade du Portage
Hull, P.Q. KIA OG4

Leslie Whitby
Director
Sust Dev, Environment Can.
351 St. Joseph Blvd, 10th flr
Hull, P.Q. KIA OH3

Fred Whitehouse
Prog Mgr
Travel Manitoba
700-155 Carlton
Winnipeg, Man R3C 3H8

John Wiebe
Sr VP
Asia Pacific Foundation
666-999 Canada Pl
Vancouver, B.C. V6C 3E1

Tom Wingrove
Dir, Earth Sc Div
UMA Engineering Ltd
1479 Buffalo Pl
Winnipeg, Man R3T 1L7

Robert Winsor
ADM, Lands
Newf. Dept Env. & Lands
P.O. Box 4750
St. John's, Nfdl AIN 2C7

Chris Winter
Research Dir
Conserv. Council of Can.
202-74 Victoria St.
Toronto, Ont M5C 2A5

Gill Wogin
Project Leader
Govt. of Canada
12th flr, E. Tow, 140 O'Connor
Ottawa, Ont KIA OG5

Andrew Wong
Project Engineer
Labtest International Ltd.
2/F, Block C, Garment Centre,
Kowloon, HongKong

Dave Wotton
Head, Terrestrial Standard
Manitoba Environment
Bldg 2, 139 Tuxedo Ave
Winnipeg, Man R3N OH6

June Wozny
Director
TransAlta Utilities
PO Box 1900, Stn M
Calgary, Alta T2P 2M1

Gren Yuill
President
G.K. Yuill & Assoc.
1441 Pembina Hwy
Winnipeg, Man R3T 2C4

William Yurko
Alta Oil Sands Authority

Dr. Reto Zach
Branch Mgr, Env. Rsch
Atomic Energy of Can. Ltd
Whiteshell Nuclear Rsch Est
Pinawa, Man ROE 1LO

Ed Zaleski
Div Mgr, Generation Plan
Manitoba Hydro
P.O. Box 815
Winnipeg, Man R3C 2P4